

COMMERCIAL
PHOTOGRAPHY

.

PUBLISHED BY PITMAN

PHOTOGRAPHY: THEORY AND PRACTICE

By L. P. CLERC. Edited by G. E. BROWN, F.I.C.
(Hons.) F.R.P.S. 35s. net.

STUDIO PORTRAIT LIGHTING

By H. LAMBERT, F.R.P.S. Second Edition. 15s. net.

COLOUR PHOTOGRAPHY

By R. M. FANSTONE, A.R.P.S. 12s. 6d. net.

PHOTO-ENGRAVING IN RELIEF

By W. J. SMITH, F.R.P.S., E. L. TURNER, F.R.P.S.,
and C. D. HALLAM. 12s. 6d. net.

THE COMPLETE PRESS PHOTOGRAPHER

By BELL R. BELL. 6s. net.

**RETOUCHING AND FINISHING FOR
PHOTOGRAPHERS**

By J. SPENCER ADAMSON. Third Edition. 4s. net.

PHOTOGRAPHY AS A BUSINESS

By ARTHUR G. WILLIS. 5s. net.

PHOTOGRAPHIC CHEMICALS AND CHEMISTRY

By J. SOUTHWORTH; and T. L. J. BENTLEY, D.I.C.,
A.R.C.Sc., B.Sc. 3s. 6d. net.

Sir Isaac Pitman & Sons, Ltd., Parker St., Kingsway, London, W.C.2.



(Photograph by the Author)

Frontispiece

**FIG. 1. A COMMERCIAL PHOTOGRAPH OF A SUBJECT
NO HUMAN EYE HAS SEEN**

An example of combination photography explained in Chapter XX
(By courtesy of Messrs. Shell Mex and B.P., Ltd.)

COMMERCIAL PHOTOGRAPHY

A PRACTICAL HANDBOOK
EXPLAINING MODERN METHODS AND
APPLIANCES FOR THE PRODUCTION OF
HIGH GRADE COMMERCIAL PHOTOGRAPHS

BY
DAVID CHARLES

LATE HEAD PHOTOGRAPHER TO MARCONI'S
WIRELESS TELEGRAPH CO., LTD.



SECOND EDITION

SIR ISAAC PITMAN & SONS, LTD.
PITMAN HOUSE, PARKER STREET
KINGSWAY, LONDON, W.C.2

HENRY GREENWOOD & CO., LTD
24 WELLINGTON STREET
LONDON, W.C.2

1936

FIRST EDITION, 1918
REPRINTED, 1928
SECOND EDITION, 1933
REPRINTED, 1934
REPRINTED WITH MINOR ADDITIONS, 1936

SIR ISAAC PITMAN & SONS, LTD
PITMAN HOUSE, PARKER STREET, KINGSWAY, LONDON, W.C. 2
THE PITMAN PRESS, BATH
PITMAN HOUSE, LITTLE COLLING STREET, MELBOURNE
ASSOCIATED COMPANIES
PITMAN PUBLISHING CORPORATION
2 WEST 45TH STREET, NEW YORK
205 WEST MONROE STREET, CHICAGO
SIR ISAAC PITMAN & SONS (CANADA), LTD
(INCORPORATING THE COMMERCIAL TEXT BOOK COMPANY)
PITMAN HOUSE, 351-353 CHURCH STREET, TORONTO

PREFACE

THE many developments which have taken place in commercial photography since the previous edition of this manual was published have required the writing of an almost entirely new book, and I am glad to have had the opportunity of dealing with the many practical aspects of the subject on a scale appropriate to the innumerable problems presented to the commercial photographer. Without exception, every method described in these pages has been proved sound and useful in regular practice, and I think I may claim that a number of them are original.

In recommending both methods and apparatus, I have endeavoured to steer a reasonable mid-course between the possibilities for those of ample funds and for those who must consider the earning power of every shilling they spend on equipment and labour. I have aimed at making the book of the greatest practical use to the greatest number (employees as well as employers) of those engaged in the many and diverse branches of commercial photography, and I must express my acknowledgments to readers of the earlier editions in almost every part of the world who have really contributed to the present work by "asking for more."

Acknowledgments are due to those photographers who have been good enough to lend me photographs of types of subjects outside my present spheres of practice, but without which no up-to-date book on modern commercial photography would be complete. Due individual acknowledgment is made against each such illustration.

Next I have to thank Mr. A. J. Bull, Principal of the L.C.C. School of Photo-engraving, for looking through the

chapter on "Prints for Reproduction," and for agreeing that my description is in accordance with the facts. Also an experienced solicitor (who desires, for reasons of professional etiquette, to remain anonymous) for reading the manuscript of the chapter on "Legal Photography," and for his valuable comments thereon.

DAVID CHARLES

CONTENTS

PREFACE.	PAGE vii
CHAPTER I	
SOME ELEMENTARY QUALIFICATIONS	1
Technical knowledge insufficient—Observation and tact— Electrical knowledge important—Resource in the printing- room	
CHAPTER II	
CHOICE OF APPARATUS	11
"Ask yourself"—Some comparisons—Extension-box for long focus—Wide-angle box camera for short focus—Uses for hand- camera—Lenses, generalities, and particularities—The margins of the field—Wide-angle lenses and halation—Camera stands	
CHAPTER III	
CAMERA MOVEMENTS	33
<i>The falling-front, its importance and how to extend it—The rising front in the studio—How swing movements help—Effect on perspective—Using movements in combination—Use move- ments in the right order</i>	
CHAPTER IV	
TIME- AND TROUBLE- <i>SAVING</i> ACCESSORIES	51
Aids to speed and accuracy—Lens panels—A tripod stay— Platform for studio stand—Focusing helps—Spirit level— Unconventional camera stands—Dark slide numbering—Flexes and plugs—Oddment tray for the outdoor kit.	
CHAPTER V	
STUDIO EQUIPMENT	67
Importance of space—Lighting limits—Arcs <i>i. e.</i> half-watts— Vertical camera bracket—Lenses for the studio—	
CHAPTER VI	
MATERIALS	80
Choice of plates, films, and papers—Storing chemicals—Prevent- ing staleness—Using paper oddments—Checking stock quickly	
CHAPTER VII	
DARK-ROOM METHODS	85
A simple "formula"—Obtaining correct temperature—Rapid fixing-bath	

CHAPTER VIII

PAGE

THE PRINTING-ROOM.

91

Why *dark-room*?—Regulating temperature—Printing boxes—Provision for shading essential—Enlargers, making the best of a condenser—Vertical v horizontal—Solutions—Washing—Brush prints—"Best possible" prints—Effect of cold solutions—System—"Double trials"—Bleach out prints

CHAPTER IX

PRINTS FOR REPRODUCTION

116

"Bright" prints—"Not "hard" prints—Get it in the negative—When the subject looks "real"

CHAPTER X

INTERIORS AND FLASHLIGHT

119

Halation—Lenses for interiors—A useful test—Uprights—Undue contrast—Interiors by artificial light—Shop-fronts at night—Flashpowders—Avoiding reflections

CHAPTER XI

PHOTOGRAPHY OF SMALL OBJECTS

137

Not necessarily "easy"—Innumerable variations possible—Showing the top while keeping uprights—When not to group—Contrasts of relief—Contrasts of surface—Contrasts in pale subjects—Colour contrasts—Memorizing filter action—Subjects under lids—Supporting awkward objects—Shadowless photographs—Logical foresight—Lenses for small objects

CHAPTER XII

REFLECTIONS

164

Good and bad reflections—Shop fronts—The billiards-ball principle—How panchromatics help, or not—Reflections from white background—To emphasize relief or to obscure scratches—Interreflections and putty—Metallic showcards—Glassware

CHAPTER XIII

ACTION ILLUSTRATIONS

182

Scope of "action"—Rapid thinking and rapid working needed—The "story" paramount—Overcoming the technical difficulties—Keeping the model still—Close-ups from "impossible" viewpoints—When light is poor—Introducing "interest"

CHAPTER XIV

LEGAL PHOTOGRAPHY

198

Portraying facts—"Control" not untruth—When measurements are required—Record of details—"Pure" photography essential—How movements help—The scene as seen—Things happen on the floor!—Lighting and colour-values important—When a panchromatic proved a point—

CONTENTS

CHAPTER XV

ANIMALS

Knowledge of subjects essential—Simple equipment only—
Problem of backgrounds—Long-focus lens—"Posing" animals—
View-finder

CHAPTER XVI

COPYING 213

Square-on, and no reflections—Placing the lights—Preventing
troubles—Various types of original—Stained originals—Cleaning
originals—Standardizing factors—A comprehensive exposure
system—Simple exposure system—Subject scale—Copying half-
tones—Copying by enlarger—Away from the workroom

CHAPTER XVII

DOCUMENTS, DIAORAMS, AND DRAWINGS 236

Reproduction on paper—Photostat camera—Playertype contact
reproduction—Ordoverax, or true-to-scale

CHAPTER XVIII

LANTERN-SLIDES 239

Printing slides by enlarger—Wastage—Avoiding fogged edges—
Diagram slides—Avoiding scratches—Tones on lantern-slides—
Masking and spotting—Reproducing from slides and from cine
films

CHAPTER XIX

BACKGROUNDS AND BLOCKING-OUT NEGATIVES 248

Backgrounds affect the subject itself—When to move the back-
ground—Use good brushes—Aids to accuracy

CHAPTER XX

COMBINATION PRINTS 254

Combining line with tone—Reversing black type to white—
Printing-in clouds—Changing a background—Pasting-on—
Photomontage

CHAPTER XXI

PRECISION WORK 263

Real precision rarely required—Accurate uprights—When sub-
jects lean—"Dead-square"—Tiny sizes—Aberrations of appar-
atus—How the commercial photographer is handicapped—
Precautions for maximum precision—Effects of uneven illumina-
tion—Effects of maladjustment—Effects of inferior lenses

CHAPTER XXII

ESTIMATING COSTS AND CHARGES 278

"Overheads"—Flat rate involves occasional loss—How profit
goes—Speed increases costs—High prices, big profits?—Unusual
work costs more—Time in after-operating work a large item—
How the time goes—A practical example

CHAPTER XXIII

	PAGE
RECORDS AND ACCOUNTS	290
Reducing clerical work to a minimum—Why proper books must be kept—Simple job card system—"Dotting," a novel device with important purposes—Journal and ledger—The monthly statement	
INDEX	301

COMMERCIAL PHOTOGRAPHY

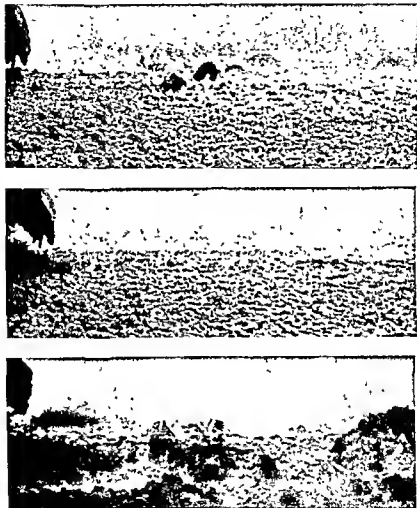
CHAPTER I

SOME ELEMENTARY QUALIFICATION

It is presumed that the student of this book is already acquainted with everyday matters of photographic technique, such as the laws which govern the relation between lens aperture and exposure, and with the more usual occasions when those laws no longer operate; with methods of determining correct exposure, and of developing his exposure so that the consequent operation of printing will be reasonably easy and successful; with the virtues of colour-sensitive emulsions, and of the more usual types of lenses; in short, that he is already familiar with the elements of "taking a photograph." Without a fair degree of familiarity with such knowledge it is not much use nowadays to embark on adventures for which the ability to make a technically correct photograph is the merest preliminary. Just as the beginner in journalism is expected to type rapidly and grammatically, and the would-be accountant to add without counting on his fingers, before the one makes his acquaintance with "the cahman's wife," and the other with "John Doe and Richard Roe," so will it be assumed in this book on the application of photography to commercial purposes that the reader has at the very least a working knowledge of photography itself and of the elementary principles underlying it.

Technical Knowledge Insufficient.

It is not sufficient nowadays that a commercial photographer should have the ability to make a technically correct reproduction on paper of a subject that is presented to him. In most cases there could be several different representations, each of which might be "photographically correct," but only



(Photograph by the Author)

**FIG 2 COMMERCIAL PHOTOGRAPHS OF
A SUBJECT NO HUMAN EYE MAY LOOK
AT OPENLY**

Stages of faulty coal-combustion in a power station furnace. The fierce flames cannot be viewed, except through a deep blue glass. Preliminary research was necessary to establish data for photographing this subject which had previously been deemed impossible to photograph satisfactorily.

one really satisfactory from the customer's point of view. It is the photographer's job to discover in advance just what is the customer's "story," and to use his photographic technique to make that story obvious. For instance, I have seen a photograph of a man carrying a portable wireless set, in which the effort involved was only too well written in his whole pose, to say nothing of his forced expression! No good saying to the customer that the set really was too heavy for the man. Far too obviously no advertisement! How easy, too, to recognize the fact to start with; to make all preliminary arrangements so that the only actual lifting would be for duration of the exposure, and that the shortest possible!

Fig. 3 exemplifies another kind of error, which the photographer used mainly to mechanical subjects is liable to fall into. The instructions to the photographer were: "Photograph a hand lifting off the receiver." He carried out those instructions with (A) as the result. This photograph was incontinently rejected by the client, who agreed that it was a good enough photograph, and that the hand was undoubtedly lifting the receiver; *ergo*, that his instructions had been carried out to the letter, but—

"Grasp the receiver like that," said he. "Now put it to your ear!" It is difficult, and never done that way!

(B) is an equally good photograph, and shows the hand correctly posed. The moral is that an action photograph must show the correct action. It is useless just to grasp the objects in any way that seems comfortable. The model must actually perform the action to be illustrated, however humdrum and ordinary it seems. (See Chapter XIII and Fig. 27.)

Observation and Tact.

One might quote many instances not quite so childishly obvious. Photographers often laugh at their *confrères*, as depicted on the stage or cinema, who take portraits in studios with field cameras, and also without troubling to insert or remove a slide, dart into a door (supposedly the dark-room) and immediately out again with a mounted print in hand! Yet the photographer himself may fall into analogous traps by portraying an interesting moment of a cooking operation on a gas-stove which has all its taps, in a big bright row along the immediate foreground, turned off. Far more

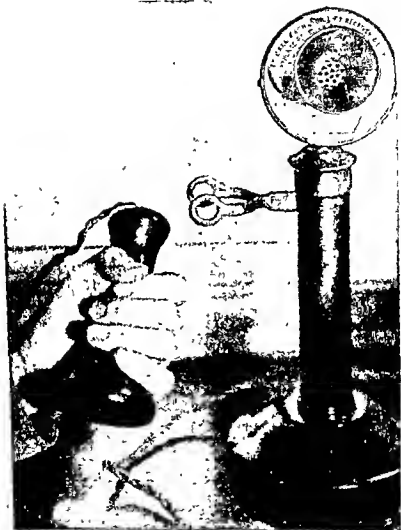


FIG. 3 (A) "ATTENTION TO YOUR TELEPHONED COMMANDS"
Instructions followed literally resulted in this technically excellent photograph being rejected by the client. Compare with Fig. 3 (B)



FIG. 3 (B)

On making the model go through the complete operation of receiving a message, the error in Fig. 3 (A) immediately became apparent

subtle an instance is that of a factory interior, photographed to show the wonderful new installation of electric light. Although taken on a dull winter evening, the faint glimmer remaining in the sky was just sufficient to make the glass-roof light in the print instead of showing the blackness of night, so that the print gave the *illusion* that it was a daylight picture. Although the effective exposure on the interior was entirely due to the lighting installation, the result seemed to negative that fact, and was therefore useless.

A whole set of photographs was once made to illustrate operations in house decorating. So deft was the man demonstrating the method, and so effectively did the prints appear to show the correct action, that it was only a chance observation that elicited the observation that the man was left-handed! A set of reprints, reversed through the enlarger, made matters right, and fortunately an apron covered the man's jacket buttons, or a lady reader might have been moved to send along some sarcastic comment!

All these instances are quoted to emphasize the need for cultivating the faculty of "observation." That is, the ability to see the subject quite detached from its aspect as a mere something to be recorded by camera. Any technical photographic problems are quite secondary to the purpose for which the photograph is required, the *story* it is to tell. There are other qualities which the commercial operator must needs cultivate also, in addition to that of quickly seizing the customer's outlook on his subject. Tact is perhaps one of the most important. Tact is called for in a busy street, when people *will* show such keen interest in the very shop-window one is photographing. Still more is it needed with the street urchin of to-day, who is anything but amenable to commands to get away, but will usually stand quite happily where he is told he will "come out best," even though the stated spot is actually *just outside* the field of view. Tact is needed with the policeman, who can with equal ease hold up the traffic for one's exposure, or evoke a summons for obstruction! Probably the occasion when tact is needed most is when the factory workers one wants to "keep quite still" are paid on a piecework basis! This circumstance is run very close, however, when one has been allowed only a very limited time to photograph a list of

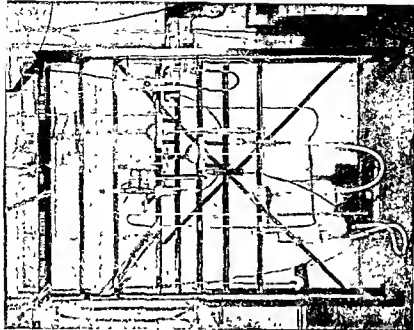
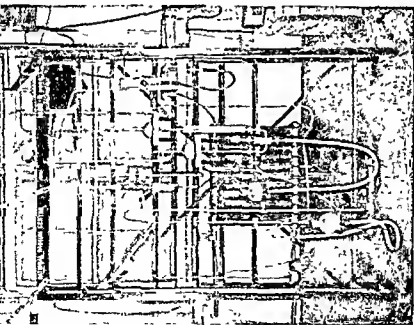


FIG. 4. APPARATUS FOR RADIUM RESEARCH

This subject was fixed at the end of a room with other fixed details, such as heater and ventilating fan, immediately behind. Other fixtures and the size of the subject prevented hanging up a sheet for background, which in any case would have exhibited ugly features. Blocking out such a subject would have taken many hours. But a sheet of white cardboard, moved about during the exposure (the latter purposely made long by a small stop in the lens), obscured the discordant details, and produced the second result without any subsequent retouching being needed. This exemplifies the need for "inventing on every job," and for constant resourcefulness to meet unforeseen obstacles which are constantly met with in bewildering variety.



subjects, but is dependent upon a certain type of slow-moving official for producing the subjects, and then, again, when one's tactfulness has been finally successful in helping to get the exposures made in the stated time, the customer who grumbles at the charge "because the work took only such a short time to do," has to be "kept sweet."

Yes, I am inclined to think that the commercial photographer needs even more human sympathy than the portrait man, for he certainly has to deal with a far wider range of people in circumstances where they are less amenable to control than in a studio. Certainly I have said enough to indicate that to be a successful commercial photographer calls for more than even the more advanced technical knowledge which it is the purpose of this book to provide.

Cultivation of the inventive faculty is invaluable to the commercial photographer, not so much in the way of constructing for himself items of equipment which either do not exist upon the market or which he cannot afford to buy, but in the way of resource in extemporizing when the subject presents unforeseen problems. Everyday examples of the need for this quality arise when, for instance, awkward pieces of machinery need propping up so as to secure a particular angle of view without the means of support being visible, or some pictures have to be photographed where the wall on which they hang is too far from the light but no easel or other means of upright support is available. Other instances arise when the ordinary camera stand is found unsuitable, as, for instance, to secure a view from among the girders of a building or through a railway carriage window. Many other circumstances could be cited in which a ready resourcefulness can prove invaluable, to choose from amongst half-a-dozen alternative modifications of method the best and right one.

Both as regards the people he has to deal with, and his methods of work, adaptability to circumstances is a great asset.

Electrical Knowledge Important.

In addition to the ability to grasp and appreciate the client's proposition and his ideas concerning it, in other words the "story" that he is to illustrate, and besides the

necessary knowledge of photographic technique which enables him to convey that message effectively, it is a great advantage to the modern commercial photographer if he possesses also some practical knowledge of electrical matters. This is because he not only has to use electric lamps in his own work, but very often needs to use them at customers' premises, where the voltage and the carrying capacity of the wiring may be very different from that of his own installation.

Resourcefulness in the Printing-room.

Even in the printing-room and other less responsible departments, the faculty of analysing and of applying resourcefulness in solving a problem is highly desirable. I would not like to accuse any assistant of to-day of such lack of foresight as was once exhibited in the making of an enlargement of a size much too large for any available dish. Bethinking himself of developing it with a sponge, and of making it at night so as to work outside the darkroom, the printer duly laid the exposed paper on a table and began mopping the liquid over it. He had not reckoned, however, with the amount of developer that such a large sheet soaks up, nor with the still greater quantity that a lack of level would cascade on the floor. He was discovered, however, frantically trying to weigh out and dissolve a fresh supply of chemicals, while the big print lay half developed and beautifully streaky upon the table. The end of that adventure I do not know. It could hardly have been a happy one!

All the same, I have witnessed many cases of trouble where a very little ingenuity would have reduced the problem to insignificance. When a printing-box failed, while some rush contract prints were in hand, the printer's dismay was surely out of place? The enlarger, focused to "same-size" would make the prints, or if the negatives were twelve-tens the paper could be sandwiched between negative and easel, while a beam of light from the lens would give the exposure required. In such a case the distance between lens and negative would be considerable, and the former should be stopped down somewhat to ensure parallel rays of light, so that lack of perfect contact pressure would not produce diffusion of the image.

It sometimes happens that an extra "stretch" of enlargement is required beyond that which the existing lantern or its run of rails provides. A short-focus lens is obviously needed, but the bellows perhaps will not rack back sufficiently. A simple problem enough, but how often is a swift solution found? To reverse the lens-panel and insert the lens so that it is inside the bellows will usually do the trick, and, if necessary, a screwdriver will very soon change the lens-flange around. Supposing that method still does not take the lens near enough to the negative? There are several quite simple ways out. One of these is to put in, still inside the bellows, a fairly big lens-mount, the cells of which have temporarily been taken out and laid aside, the small short-focus lens having been first very carefully and gently clipped by its thread in the diaphragm, in the manner shown in the illustration of the large iris lens-holder (Fig. 24). That improvisation will shorten the extension by an appreciable distance.

The above examples are only a couple out of many scores that could be cited to suggest how necessary it is to cultivate, in the commercial workroom, as much activity of mind as is needed in actually taking the photographs.

CHAPTER II

CHOICE OF APPARATUS

THE question, often put to me, as to what is the best apparatus for commercial photography is by no means an easy one to answer. The reason for this difficulty is because the term "commercial" covers such an increasingly bewildering variety of subjects, and because the ideal apparatus for many of these varieties is necessarily less suitable for some of the others.

Ask Yourself !

The best answer to the question is usually found by a sort of self-cross-examination. Something like this—

What class of subjects have I been photographing in the past?

Has my apparatus been ideal for that class of subject?
If not, . . .

In what *exact* respects could I look for improvement? E.g.:

CAMERA	{	Portability?
		Variety of extension? (i.e. for extra wide-angle, or for extra long-focus lenses, or for close-ups)
		Rigidity when set up?
		Speed in handling?
		Sufficient "movements"?
	{	Interchangeability of lenses?
STAND	{	Rigidity plus portability?
		Quick levelling plus non-slip?
		Limits of lowness and height?
		Amount of tilt possible with safety?
	{	Usable with all cameras?
LENSES	{	Rapidity?
		Covering power?
		Against the light?
		Definition when results enlarged?
	{	etc., etc., etc.

What class of subjects do I hope to add to my present list?

In what way *exactly* do they differ from those I have been used to? . . . and therefore . . .

What additional facilities, if any, should further purchases provide?

Once one has got some definite facts noted down as replies to these questions, it becomes merely a matter of looking for gear which shall possess the desired qualifications. It will be discovered quite soon that it is hopeless to cover the whole gamut of requirements with one, or even with two cameras. One can, of course (and one occasionally does) photograph prize animals quite successfully with the same field camera that one uses for architecture. But it will be found that some beasts will be alarmed by the mere flapping in a breeze of the focusing-cloth! Others will move from the spot during the operations of inserting the dark-slide, and so on, and the results may show them minus noses or tails, as the case may be! So that if animal photography is to be more than a very occasional sort of job, the purchase of certain accessories, or even of a reflex camera, will be essential. On the other hand, a reflex camera will hardly do much architecture; for it has but little rising-front, and no wide-angle capacity.

Comparisons.

A good whole-plate field camera forms the basis of practically every commercial photographer's outfit. For some reason unknown to me the types of field cameras possessing the greatest range of "movements," and therefore the best adapted to the greatest variety of subjects, have disappeared from the market, excepting the "Sanderson," and Sinclair "Una," and the former is now made only in quarter-plate and twelve-by-ten sizes. The differences between the square-bellows and the taper-bellows patterns of the present-day makes that I know may be summed up by saying that the former is heavier to carry but possibly more rigid at long extensions, but it has no swing to the lens front. The taper pattern is less bulky when closed, lighter in weight, has more swing to the back, allows of swinging the front, and of dropping it far more than the square-bellows does (see Fig. 13, *et seq.*). At first sight the tapered camera seems better adapted to very short focus lenses. This latter drawback can be overcome in a square-bellows camera by use of a sunk lens panel, and I should like to see this pattern improved

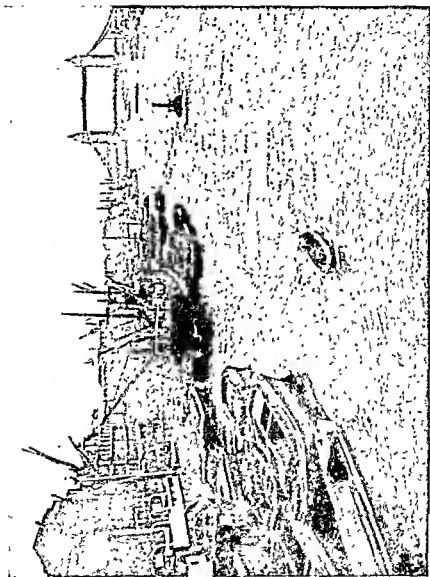


FIG. 5. USE FOR HAND CAMERA

by provision of more swing each way to the back, which could easily be arranged by the simple means of providing longer struts than the usual short ones.

An Extension-box.

For extra-long extension purposes, such as telephoto work, it is better to use a solid extension-box rather than to rely on a very extended camera. This applies, of course, to outdoor work, since for studio purposes the big portrait type of camera is often found to be suitable. On the other hand, when the subjects call for a range of movements (see Chapter III) it will often be found preferable to use a field camera, even in the studio. An extension-box, such as is suggested and illustrated in Figs. 36 and 37, can not only be easily made at small cost, but it can be conveniently carried by utilizing it as a carrying case for some of the other gear.

A Wide-angle Camera.

For wide-angle work it has long been recognized that neither of the ordinary types of field camera is ideal. For one thing it is not easy with either type to ensure the perfect parallelism between back and front that gets the best results from short-focus lenses. Then there are the two difficulties that the operator is usually terribly cramped for working space when he tries to focus an interior, and when he has at length succeeded in composing and focusing his subject, and in extricating himself from between his camera and its surroundings he may find it impossible fully to draw out the shutter of his dark-slide! These familiar troubles, with expedients to overcome them, have been the subject of innumerable articles in the photographic press since photography first became commercial! In order entirely to overcome these drawbacks, I had a camera constructed on somewhat novel lines. It seemed to me that if one used a really good wide-angle lens with sufficient depth of focus (the latter being an inherent property of short-focus wide-angle lenses even at maximum working aperture), and one fixed this definitely opposite to the centre of a plate of a size that would include *practically the whole of the field*, one would abolish at one stroke both the need for focusing and the need

for using a rising-front. This because the plate would reproduce practically everything that the lens could project, and the parts of the view *not required* could be excluded afterwards by the simple process of enlarging out the essential portions. In building the camera on these lines, provision was made for a definite but very slight shortening of the extension for use only when photographing outdoor (i.e.

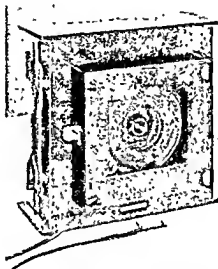


FIG. 6. THE WIDE ANGLE CAMERA AS USED ON A BENCH FOR AN HORIZONTAL EXPOSURE

more distant wide-angle) subjects. This was achieved by a square lens-panel so designed that with the lens on one side the focus is right for interiors. Unscrewed and reinserted in the same flange with the panel reversed back to front, the focus is fixed for outdoor subjects. Since focusing difficulties are abolished, it becomes practicable to insert and open the dark-slide as the very *first operation*, instead of being the last before exposure, and of placing the camera just that extra yard farther back that every photographer of interiors so longs for.

In case there be occasions when it is of paramount importance that particular detail at the extreme margins of the field be included in the view, this is arranged for by a square frame "view-finder" that clips on the front of the camera

A Revolutionary View-finder.

Instead of viewing the ground-glass image, the operator just walks about in the room, and looks towards the lens. So

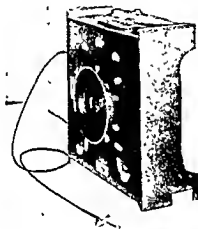


FIG. 7. THE WIDE-ANGLE CAMERA PLACED ON A SHELF, CLOSE AGAINST THE WALL, FOR EXPOSURE ON AN UPRIGHT SUBJECT

long as he can see the centre of the lens (or of its cap) his eye would be on the plate if he stayed there! As soon as the viewing-frame cuts off the sight of that dot, that place where he stands is off the plate. This simple finder is found to be accurate to 2 in. of the view, i.e. it will determine whether a leg of a chair is on the plate or not. This frame-finder packs inside the box-camera for carrying.

The lens already, by letting it record nearly the whole circle, includes a good deal more than will any wide-angle

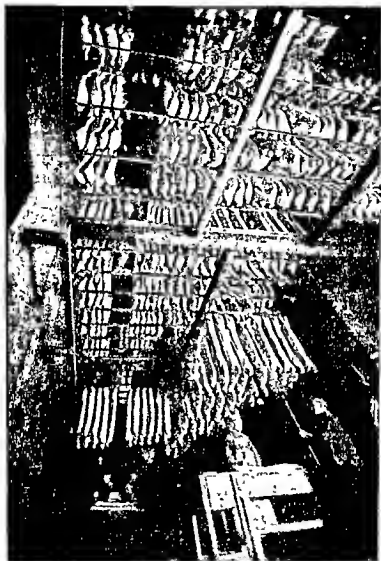


FIG. 8

An unconventional wide-angle view, exposed by flashlight, of a bacon-curing factory, taken at fixed focus with the above camera

lens used in the ordinary way, but provision is still made, by movable eccentric panels on the camera front, for utilizing, on exceptional occasion, the extreme margin of the field not

included on the narrow way of the plate. Still more important and useful is the fact that the camera carries its own levels, and is built as regards its outer dimensions exactly rectangular.

Stands Anywhere.

This fact allows the camera to be held flat against a wall (or in a corner against the two adjacent walls), or stood on

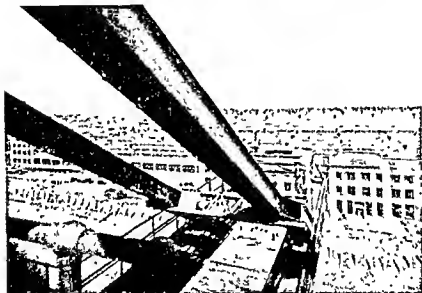


FIG. 9

An outdoor wide angle photograph, taken in a wind that made ordinary focusing methods impossible, with the fixed focus angle camera

a table, shelf, or window-ledge, etc., etc., if such a support should be more convenient than a tripod. It can even be laid upon the floor to photograph a ceiling, with the certainty that the latter will be photographed perfectly "square-on."

It will be obvious that the advantages of such a constructional departure from the conventional are great, and that this combination of fixed-focus plus "more-than-you-want-in" allows of placing the camera with confidence at points to which the operator himself cannot climb, and therefore enables all sorts of novel angles to be obtained. Naturally,

it will be realized that this outfit does not in any way replace the normal camera for general work, but so outstanding have its advantages been found that the Kodak Co. have placed it on the market in a more perfected pattern than my original model. Additions of my own to this camera have been a panel carrying a Hypergon lens for use when the necessary extra exposure has been possible and the risk of flare (to which this lens is more liable than is the little Protar) is not present, and another panel carrying a little $f/4.5$ lens in a shutter and focusing flange. The latter is carried because it so often happens that when going out ostensibly for a wide-angle job, one is asked to photograph some other subject, for which neither the short-focal length nor the slowness of the Protar would be suitable. This extra lens and flange pack into a quarter-plate box which goes inside the camera for conveyance.

It may be of interest that I have used this camera, making exposures straight off with no more preliminaries than just drawing the slide and standing it down or propping it against the wall in such subjects as for instance: "What the policeman saw from the window," "Under the bed," "From behind the bathroom door," "At the foot of the cellar steps," and many others, where to focus in the ordinary way would have meant either standing on my head, or reducing myself to the thinness of a rasher, neither of which is now physically possible.

Uses for a Hand-camera.

The up-to-date commercial photographer finds many occasions for the use of a hand-camera in preference to his stand instrument. Sometimes he is required to take photographs from aspects where the erection of a tripod would entail severe physical difficulty or even danger, and where focusing in the ordinary way would be impracticable. Action-pictures, too, of many kinds form an ever-increasing demand, whether it be of people at their work of producing articles in course of manufacture, or crowds attracted by a particular display, or again scenes such as the loading and unloading of ships. Such subjects as these, and many others, are much better handled by the use of a hand-camera, if it were only for the incidental fact that the stand-camera

operator is at the mercy of any passer-by who happens to obscure his lens at a critical moment; and when photography is in the offing, such passers-by appear to accumulate in disconcerting numbers. Many workers are attracted by the advantages of the miniature camera, by reason of its great depth-of-focus while the lens remains at an aperture which permits of instantaneous exposures, to say nothing of its capacity for a large number of exposures at a loading. Others prefer the reflex type of camera, which provides greater ease in composing and focusing the subject upon the ground-glass screen. Unless the operator has the pressman's faculty of rapid and accurate distance-judging, either of the former will be found preferable to other forms of hand-camera such as the press, or the folding-pocket types. A reflex camera of either the miniature-twin-lens pattern, or the bulkier box-reflex fitted with a film-pack adapter provides a means of firing off a number of shots in rapid succession equally with the camera which takes cine gauge of film, whilst giving a bigger margin of area for subjects which are not perfectly composed and centred.

Lenses—Generalities.

Of lenses the commercial photographer has an extensive choice. For general use upon whole-plates a lens of from 10 to 12 in. focal length is satisfactory. For other sizes the focal length should be in proportion. Speaking generally, a lens made with a maximum aperture of $f/8$ provides certain qualities which have to be sacrificed to some extent in some more rapid types. First, there is the extra covering power allied with flatness of field, enabling a subject to be photographed at a comparatively large aperture with good definition all over, even if the rising front or other movement is called into play. Secondly, such a lens will usually be found to work well against the light, which some $f/6.3$ lenses certainly do not; and the number of $f/4.5$ lenses that do not cause trouble when the light shines directly into them is distinctly small. It is, of course, against all photographic teaching that the light should be allowed to shine on the lens at all! But then the commercial photographer just has to do these naughty things which lens-makers say he should not. He cannot, for clients will not, wait for hours till the

sun obliges by moving around from behind the subject. Then there are the occasions when his subject itself is just the source of light itself, whether it be a stained-glass window or a bank of floodlights, or the fierce flames of a blast-furnace (Fig. 2), too bright for the naked eye to bear.

The superior flatness of field of the $f/8$ type of anastigmat renders it suitable for copying and particularly so for enlarging. It is a myth that the rapidity of a $f/4.5$ lens makes it valuable, because of its speed, for enlarging. It may be so for the pressman, who uses direct condenser illumination, with all its crudenesses, or for the portraitist, to whom marginal definition matters not at all. But the commercial photographer, who often wants the detail at the edges to be as sharp as that in the middle of his print, will find that some of the best $f/4.5$ lenses may need stopping down well below $f/11$ to achieve this when enlarging with them. There is very much to be said in favour of lenses specially produced for the purposes of copying and enlarging. For instance there is nothing better than a process-lens for copying, especially for originals of technical subjects and for paintings and the like which call for the use of filters. Also a lens designed especially for enlarging will do its work perfectly with less stopping-down than other types. The previous comments are made for the benefit of the many who prefer all-purpose instruments.

Value of a Good $f/4.5$ Lens.

It should not be supposed from the above remarks that I have any prejudice against lenses having an aperture of $f/4.5$ or larger. On the contrary, they are invaluable, and in fact essential, when the moving subject requires a minimum of exposure time, or, on the other hand, when a still subject needs selective focusing; that is to say, when certain parts are required to be sharp against the surrounding diffusion. It may fairly be assumed, however, that one has to pay, for the increased speed of a lens, something beyond the actual extra cash outlay. In other words, it should not be expected that a lens of large aperture stopped down to $f/8$ will behave quite as well in every possible respect as another lens of $f/8$ maximum aperture. Any rapid lens should be tested rather suspiciously, especially if a second-hand one, if there is a likelihood of negatives produced by it being greatly enlarged

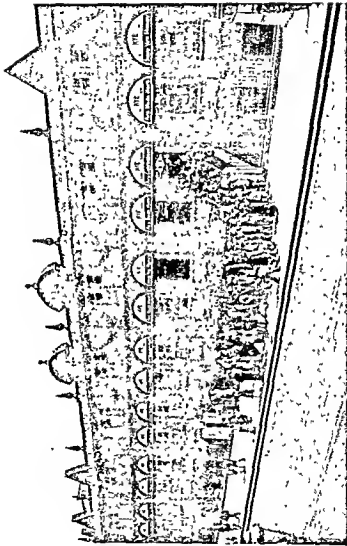


FIG. 10. PHOTOGRAPHED WITH A HALF-PLATE $f/4.5$ LENS ON A WHOLE PLATE

A slight side-swing renders the whole receding length sharp at open aperture and permits of an instantaneous exposure

from; some rapid lenses are apt to produce flat negatives on slight provocation. On the other hand, there are some makes of speed lens that behave, under the most provocative circumstances, quite as well as other types, besides possessing other important advantages. For instance, I have three such lenses of one British maker which, at an open aperture of $f/4.5$, have actually done duty as medium wide-angle lenses in the following varying circumstances. It was required to make an exterior of a factory in a dull London street, but to include the workers going in, which precluded the usual small aperture wide-angle lens. From an upstairs window opposite, it was found that the factory building would just go on the whole-plate with an $8\frac{1}{2}$ -in. lens, and although nominally a half-plate lens, it will be seen in Fig. 10 that the definition is perfect over the whole length of the subject at open aperture. On another occasion a 6-in. of the same make was used on a whole-plate for a factory interior where the workers were not amenable to the long exposures ordinarily required of one or two minutes, and where flashlight was ruled out. The 6-in. lens being nominally for five-by-four did not quite cover the whole-plate, but with the black corners partly trimmed off, the print was far superior to one full of "moves." A third, and quite different kind of subject, was an absolutely black carved roof which could only be photographed before ten in the morning. To include sufficient of the roof without having to give an all-day exposure was achieved by the use of two 500-watt lamps pointed upwards, and an exposure of ten minutes at $f/4.5$. This again was a half-plate $f/4.5$ lens used on a whole-plate. (This subject is shown in Fig. 11, and it should be noted how the focus is equalized over a receding subject by the methods explained in Chapter III.) It is therefore safe to say that many a reflex or press-camera owner who thinks his lens is built only for speed might advantageously try it out on a stand camera of larger size to see how it may serve him in an emergency.

Process Lenses.

The man who has a lot of copying to do will do well to invest in a process lens. This is especially the case if his work involves fine and accurate line work, such as maps and

scale drawings, to be reproduced larger than half-plate size. If the work needs the use of colour filters, not only is a process lens designed to use them without appreciable alteration in focus, but the slot at the diaphragm is a great convenience for the slipping in and out of gelatino filters. A process lens can be used for other work than copying, of course, but in my own experience it shows definite limits in the way of covering power outside the plate it is listed for, and is liable to cause trouble if light is allowed to fall on it. The latter remark, strangely enough, does not include the light from an enlarging lantern through the negative, and with its supremely flat field, a process lens is excellent for enlarging from negatives which have small detail all over them. It will give better results in that respect, slightly below the open aperture of $f/8$ than many a rapid lens stopped down to $f/16$.

Another point in copying and enlarging fine line work in which the process lens shows great superiority is the evenness in quality of the reproduction. If an ordinary rapid lens is used to copy fine originals, there is always a liability for fine details in the middle of the print to be thinner and fainter than they should be, while those at the margins may turn out thicker and blacker.

When a Portrait Lens is Useful.

The old-fashioned Petzval portrait lens has but little use in commercial work, but if there happens to be one amongst the photographer's possessions it should not be discarded as entirely useless. In these days of increasing popularity of cine cameras one never knows when one will be required to enlarge from a film, or for the matter of that, a small detail from any negative, and there is no doubt that the particularly keen definition right in the centre of the field of the Petzval lens, combined with its great rapidity, make it still unsurpassed when the need arises for extra good definition on a small detail. A portrait lens can even be used on a reflex camera when an isolated occasion calls for some extra speed above all other considerations, but when the purchase of an anastigmat lens faster than $f/4.5$ is not warranted. The Petzval lens, however, must be shielded from extraneous light far more stringently than most others.



FIG. 11. AN ABSOLUTELY BLACK ROOF, PHOTOGRAPHED ON A WHOLE-PLATE WITH A
HALF-PLATE LENS AT 14.5

Note the equalization of focus by means of movements to avoid necessity for hours of exposure

scale drawings, to be reproduced larger than half-plate size. If the work needs the use of colour filters, not only is a process lens designed to use them without appreciable alteration in focus, but the slot at the diaphragm is a great convenience for the slipping in and out of gelatine filters. A process lens can be used for other work than copying, of course, but in my own experience it shows definite limits in the way of covering power outside the plate it is listed for, and is liable to cause trouble if light is allowed to fall on it. The latter remark, strangely enough, does not include the light from an enlarging lantern through the negative, and with its supremely flat field, a process lens is excellent for enlarging from negatives which have small detail all over them. It will give better results in that respect, slightly below the open aperture of $f/8$ than many a rapid lens stopped down to $f/16$.

Another point in copying and enlarging fine line work in which the process lens shows great superiority is the evenness in quality of the reproduction. If an ordinary rapid lens is used to copy fine originals, there is always a liability for fine details in the middle of the print to be thinner and fainter than they should be, while those at the margins may turn out thicker and blacker.

When a Portrait Lens is Useful.

The old-fashioned Petzval portrait lens has but little use in commercial work, but if there happens to be one amongst the photographer's possessions it should not be discarded as entirely useless. In these days of increasing popularity of cine cameras one never knows when one will be required to enlarge from a film, or for the matter of that, a small detail from any negative, and there is no doubt that the particularly keen definition right in the centre of the field of the Petzval lens, combined with its great rapidity, make it still unsurpassed when the need arises for extra good definition on a small detail. A portrait lens can even be used on a reflex camera when an isolated occasion calls for some extra speed above all other considerations, but when the purchase of an anastigmat lens faster than $f/4.5$ is not warranted. The Petzval lens, however, must be shielded from extraneous light far more stringently than most others.



FIG. 11. AN ABSOLUTELY BLACK ROOF, PHOTOGRAPHED ON A WHOLE-PLATE WITH A HALF-PLATE LENS AT $f/4.5$

Note the equalization of focus by means of movements to avoid necessity for hours of exposure

Telephoto.

A telephoto lens of the modern fixed kind is of less use to the commercial photographer than to the pressman, but the comparatively obsolete and almost forgotten variable type of telephoto objective can be of great service to the man who needs to make close-up photographs of inaccessible architectural details. On the other hand, when an anastigmat lens of long focus can be employed, with subsequent moderate enlargement from the negative, to obtain results of the desired scale, the latter is usually a preferable method. For photographs of buildings and many other commercial subjects in which it is desired to impart an impression of artistic "atmosphere" rather than of microscopic definition of detail, a variable telephoto lens will be found invaluable. By variability is meant the feature, exclusive to this particular variety of lens, that allows one to adjust the focal length, within surprisingly extensive range, to suit the individual subject. By this means the exact amount of view required is made to fit the plate while focusing the image on the ground-glass screen. The disadvantages of this kind of lens are the extraordinarily long exposures needed and the necessity for rigidity of apparatus to secure the absence of the slightest vibration.

The Margins of the Field.

Reference is made on page 35 to the use (in some circumstances the very frequent use) of a lens considerably out of centre with the plate. The results of doing this are largely nullified if the lens is of considerable focal length in comparison with the plate size. For instance, on half-plates one would not normally use a lens focus longer than 11 or 12 in. It will be clear that only lenses covering a circle of substantially larger diameter than their focal length would be any use in this connection, since only half that diameter frequently is used. Lenses best answering this description are anastigmats of $f/8$ maximum aperture, and the wide-angle anastigmats of still lower open apertures. These latter may sometimes give superior performance, but owing to the smallness of the largest stops they will not be so comfortable to use as the first-named during the preliminaries of arranging and rough-focusing the subject on the screen.

Wide-angle Lenses and Halation.

Wide-angle lenses call for more careful discrimination in selection than those required for rendering detail only in a small portion (towards the centre) of the "field." Among wide-angle lenses the "symmetrical" type is comparatively cheap. Its disadvantages are that the actual area of image usually does not extend to a useful extent beyond the size of plate each lens is made for. Therefore there is little or no scope for occasions when the use of the rising or falling front is called for, and in any case the definition in the corners of the negatives will seldom be very keen, even with small stops; so that detailed machinery, and so on, will not be perfectly rendered in those portions, especially if enlarged prints be made. A wide-angle anastigmat, on the other hand, is almost essential if enlarged prints are required, and it is an unquestionable fact that the choice of a good lens will do much more in reducing halation than backing the plate. Strange to say, naked lights in interior subjects are not so much to be feared as is generally supposed. Certainly they often are seen in photographs surrounded by a ring, but in such cases inquiry will usually elicit the information that an unbacked plate of the "Special Rapid" type has been employed, and possibly an "R.R." (or what is the same thing, a "symmetrical") lens.

Backed plates, especially of the ortho or panchromatic varieties, rarely will show this particular form of halation, which has practically disappeared from competent commercial practice to-day. So has the fault of "ghost," i.e. images of the light sources, or sometimes only rings of light, appearing in unaccountable places upon the image. Early lenses often produced this fault when used against the light. A larger area of strong light, on the other hand, will easily produce marked halation except with the best of lenses and emulsions. It is usually to be found more troublesome towards the margins of a wide-angle picture, and where such brilliant areas of light form an essential part of the image, it is advisable, if possible, not to let them lie on the marginal portions. Halation trouble is always much more accentuated when windows fall at the ends of a plate, because there is a strong combination of symptoms which takes very careful treatment and favourable conditions entirely to

eradicate. Easily the first of the combining factors conducive to halation is an optical one. In the writer's experience large aperture anastigmats, as compared with those of modest speed, not only give more general glare over the plate when photographing "against the light," but also tend to more marked spreading around the actual images of the windows or lamps. Probably this is due to inter-reflection of images between the glass surfaces. Next, it must be remembered that rays which enter the emulsion obliquely, as they do at the edges of a wide-angle photograph—when they are scattered by the over-exposure that such bright portions get—will naturally be reflected or irradiated at a greater distance from the original points of attack than the more direct rays in the middle of the field.

Again it will probably be found that some portion of the brightness strikes the bellows or the woodwork inside the camera and is reflected on the already too strong brilliance at the plate's margin. This it is almost always impracticable to cut off with a hood. A folding screen, if there be one in the room, can sometimes be used to cut off some of this unwanted light without casting extra gloom into the shadows, but a lens shade of such dimensions is seldom available. The last of the complicating factors is the most insidious of all, perhaps, because seldom recognized or looked for, while its effects are bad enough even on the rare occasions when it exists alone. It is as follows.

When a "pencil" of light strikes a white surface at an angle the "circle of diffusion," that is to say, the section of the bundle of rays, is necessarily expanded into an oval. This point is easily demonstrated by the simple experiment of cutting a round broomstick, or even a banana, on an angle. It must be remembered that an image at the plate surface is largely composed of bundles (or "pencils") of rays, rather than points of light, and that the circles or ovals, are all overlapping one another. Furthermore, when the angle at which a pencil strikes the plate gets more acute, as at the margins of a wide-angle photograph, there is apt to be a little extra fringe of light scattered over the surface even beyond the edge of the oval! So that there are several forms of spreading light all acting at one time. This point

is well demonstrated by making a series of pinholes on one end of a waste negative, and, placing it in the enlarger, noting how far it is necessary to stop down for the pinholes even after the *imago* seems sharp. The demonstration is more effective, of course, if a short-focus lens is temporarily fitted, or if the easel is slanted, to get the pinhole images at an extreme angle to its surface.

All these forms of light-spread, whether singly or together, are called "halation," but to find a cure it is advisable to know all the various possible causes of the trouble.

For these reasons, too, it is desirable to choose for wide-angle work a lens made for the purpose, and it will be found in practice that far better results are obtained from an objective whose largest working aperture is but $f/16$ or even less, than from one which can be made to "cover" only by extreme stopping down. Quite apart from the improvement in definition and the reduced tendency to halation trouble, a good lens designed for wide-angle work upon a given plate, will give more equal illumination as between the centre and margins, than a normal type of lens of equal focal length stopped down to the same extent.

For instance, many a fine anastigmat is designed to produce the utmost definition at a large aperture over a certain plate, but stopping down in such a case will not necessarily broaden the circle of illumination. Therefore, if used as a wide-angle lens over a larger plate than it is constructed for, one must not expect to get the effect in the outer area that is given by an instrument made for the job. Certainly lenses are sometimes to be found which will act well both as narrow and as moderately wide-angle objectives, but they are less among the rapid anastigmats than among the better makes of moderate maximum aperture, such as $f/8$, which is an excellent form of all-round lens for commercial work.

What the Customer will Notice.

Insistence upon this point is due to the prevalence of the notion that any fairly decent quarter-plate lens will serve for whole-plate wide-angle work if only stopped down enough. Even if the image is there, the chances are that in the corners of the print the detail will be darker as well as

even nominally of exactly the same make and kind, do sometimes behave differently.

How to Prepare for Testing a Lens.

It is easy to make a reasonably good test of any lens by mounting it on a cardboard panel. Instead of screwing the flange to the panel, a hole is cut in the cardboard (for heavier lenses, plywood), just large enough for the thread of the lens to go into, and the flange can be screwed on to the lens mount at the back of the temporary panel to secure the lens in place. When setting up the camera, it is necessary to ensure that the lens is in correct alignment with the focusing-screen, but that is easily done by getting the camera-back upright, and then accurately adjusting the lens; but instead of holding the cross-level against the woodwork of the camera front, using it against the lens hood itself. Even in ordinary practice for critical work this is the best way to level the camera parts because there are very few field cameras (I have never found one yet) in which the woodwork is so accurately made that the back and front of a camera can be relied upon as upright if the baseboard is levelled.

Camera Stands.

Of camera stands there are nowadays many in addition to the old-fashioned tripod. This latter is still probably the most convenient (and it is undoubtedly the lightest to carry about) when one is working from eye-level or thereabouts on normal sorts of work in the street, garden, or other such place where the ground is rough enough to give foothold and is so unlevel that moving from one subject to the next requires fresh adjustment for uprights. When working on a level floor, on the other hand, the camera once levelled should stay so even when moved about. For work on slippery floors, or upon those over which many feet are passing to and fro, with risk of kicks at the camera stand; when the subjects need a somewhat elevated camera, or the latter requires much tilting up or down, or, in fact, when any exact adjustments must be combined with firm stance, one can hardly do without a stand of the home-portrait type. There are several kinds. Some have only small limits of maximum height. Some have a revolving top, others not. Some of them are

rather heavy to carry, but some of the lighter patterns need the rather weak struts to be soon replaced with stronger ones, especially if one uses upon it a camera as large as it is listed to support. Like ourselves, they are none of them the perfect ideal.

Those who prefer the ordinary tripod, either on account of its neatness, or its comparative cheapness, or because their subjects are of the limited class that can conveniently be photographed from eye-level, are advised not to go too far in their search for compactness and lightness of weight. A substantial tripod, and especially one with a fairly broad top in comparison with the size of the camera to be used on it, makes for positive convenience in use, and in windy weather its steadiness is a great asset.

CHAPTER III

CAMERA MOVEMENTS

THE earliest cameras, and certain types of present-day cameras, had and have the lens permanently fixed centrally opposite and in perfect alignment with the plate. Arrangements for moving the lens from this position, apart from the purely to-and-fro focusing movement, however hateful to the designer thereof, have gradually been introduced for either of two distinct purposes, viz. (1) for inclusion of detail which is within the circle covered by the lens image, but outside the area of the plate when the lens is central, and (2) for adjusting the plane of sharp focus to that of the plate for parts of the subject which lie at differing distances, and so obtaining apparent "depth of focus" without need for an unduly small stop, and consequently for prolonged exposures.

More often than not both these needs present themselves in one and the same subject, as we shall see.

Besides To-and-fro You May Need These.

These arrangements for adjustment of the camera parts are called "*movements*," and they may be classified as follows—

Camera front	{	rise. fall. forward swing. backward swing. side swing. side slide.
Camera back	{	forward swing. backward swing. side swing.

Before describing some of the uses of these movements that are not universally known (as is, for instance, the rising front), it will be useful to remark on the extent to which these adjustments exist in various types of camera, and to

show how the lack of them may sometimes be compensated for. The rising front, being an item that has been demanded of a camera by photographers for upwards of half a century, is fairly well understood by designers, and there are now few field cameras, of either the square- or taper-bellows patterns, that have not a liberal movement of the lens panel in this

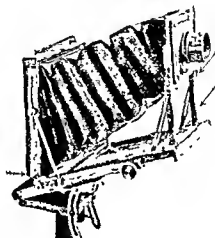


FIG. 12. LENS
WHITE
The arrows show

LENS
to

upward direction
ment is often a
latter pattern of
panel, illustrated
without strain
often possible to
by the method
the lens to po
vertical, is not
of details of the

is move-
s in the
eccentric
the lens
era it is
the limit
swinging
ra back
efinition

Falling-front most Useful but Rare.

The falling- or drop-front is a feature that is not nearly so well provided for as the rise. Excepting in recent types of square-bellows camera, it hardly exists at all, in relation to its importance. The degree to which the ordinary camera allows the lens to drop below the centre is shown to be quite ridiculous on looking at Fig. 13, which shows a relation

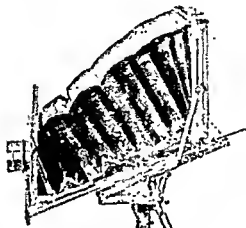


FIG. 13. EXTREME DROP FRONT WITH THE CAMERA SHOWN IN FIG. 12

Note how the alteration to the woodwork permits this.

between lens and plate which I suppose any self-respecting lens- or camera-designer would scoff at, yet is one which I constantly need and use for obtaining quite ordinary commercial photographs of every-day subjects. (See page 141.) It should be remarked here that the square camera does not permit of this attitude to quite the same degree, but can be made to do so if one has a camera of this type of a larger size than the negative to be made, and if the plate is inserted in a special carrier (see Fig. 14). This holds the smaller plate at the top end of the larger dark-slide. Since it is in the photography of objects in the studio that this extreme movement is chiefly concerned with, the making and using of such a carrier present little difficulty.

It must be pointed out also that the adjustment of even a field camera to the position shown in Figs. 13 or 15 is not

always possible by reason of some individual feature of construction. In fact, there are very few cameras indeed (and I regard it as a very serious fault in the design of the vast majority) that the swing movement to the back is usually very restricted in this particular direction when the back is pushed any distance along the baseboard towards the front. In the particular camera shown, and in others, I have

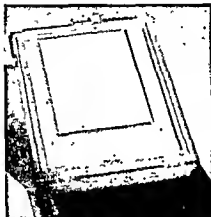


FIG 14. A CARDBOARD CARRIER TAKING A HALF-PLATE AT THE UPPER END OF A WHOLE-PLATE SLIDE IS EQUIVALENT TO AN INCREASE IN DROP-FRONT

had the woodwork at the base of the back, and at the lower part of the front frame, cut away for the purpose of obtaining this low fall to the lens, as indicated by the arrows in Figs. 12 and 13. Fig. 15 shows a method of obtaining the same adjustment to cameras where the range of movement is differently provided for.

Fig. 15A is the same camera reversed on the stand. This is less rigid than Fig. 15 because there is no actual support for the baseboard, but it carries the lens still farther down, and also farther free of the stand. This attitude of the camera and stand will be found useful as an emergency arrangement when photographing a street scene from an elevated window, because it permits of working close to, or even over, the sill, and so of securing unobstructed views of low-placed detail opposite without sacrificing upright rendering of vertical

details in the subject. Use of a lens of particularly good "covering power" is indicated.

It is noteworthy that the eccentric panel in Fig. 23 can sometimes be usefully employed in this connection of obtaining the maximum fall of the lens. Sideway movement of the lens-panel is found in square-bellows cameras but is so seldom used that many operators do not know its purpose.

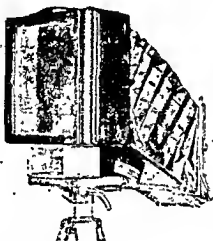


FIG. 15. SHOWS A SMALL "BOX" BETWEEN CAMERA AND STAND
This allows the baseboard and lens panel to be dropped low in the
type of camera shown

Probably it is only a survival of the rising front on pre-reversing-back cameras.

The swing of the lens board either forward or back should be provided by pivots on either side of the central lens position, so as not appreciably to alter the extension as the lens is swung. Usually, however, this movement is arranged, for convenience of construction, by hinging at the lowest point of the front frame, which necessitates alternately focusing and swinging in stages, till the best adjustment has been obtained. On a square-bellows camera this swing of the front is not obtainable excepting by the clumsy method of tilting the whole camera, and then uprighting the back, also in successive stages if accurate adjustment is desired, and in any case it is available only to a very limited extent. The reason for the limit is partly due to the absurdly

small range of swing provided on this type of camera, and partly to the fact that the swing is often still more limited when the back is not at its extreme extension, by reason of the clearance of the reversing frame above the baseboard being sometimes insufficient

If One Won't, Perhaps Its Opposite Will.

It will be realized from the foregoing that these various movements are interdependent, and limits of one should

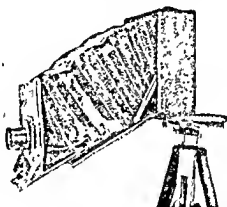


FIG. 15A REVERSING THE CAMERA ON THE STAND SOMETIMES PERMITS OF AN EXTREME FALL TO THE LENS

always be considered with regard to possible extension in another. Unfortunately, camera designers have by no means kept up with the requirements of the advanced technical worker nor with possibilities of modern lenses. One therefore has to improvise methods for oneself. For instance, the item on my list of the side swing to the camera front does not exist on any camera that I know of. The side swing to the back is only made possible for use by mechanical imperfection in construction, but it does exist, to a limited extent not always sufficient for special cases, so that on some of my cameras I have had the swing front fitted by mounting the struts on a flat metal strip which is pivoted on a central binding screw to the extension frame. A small amount of side swing to the lens does nearly the same thing as quite a

big swing to the back. For a camera which has no side swing to the back, like the one shown in Fig 15, a similar movement to the front is quite essential to much commercial work, or how could a receding subject such as Fig. 10 be sharply focused at open aperture?

Back Upright First.

Having already described how the movements of the back can be employed in combination with those of the front, it is not necessary to describe them further, excepting for one important observation. It is a very prevalent practice, born of the customs of the portrait studio, to regard the swing back as a movement with which to "correct" the uprights or for equalizing the focus, and so on, after the working of the other movements has been arranged. To my mind this is taking hold of the wrong end of the stick. If the subject is one which has vertical lines, which should appear so in the negative, it saves a tremendous amount of juggling, and of subsequent readjustment, if the back be fixed in the correct upright position to start with. If the subject is of the kind which I propose to describe next, which calls for the use of the extra drop front, shown in Figs. 13 or 15, that fact is known in advance, so that the camera can be placed so, again with the back truly vertical at the start. It should be obvious that if such an extreme amount of drop be found too much, the lens can easily be raised again as required without disturbing the body of the camera, even to the central position opposite the plate, by means of the ordinary rising-front adjustment.

Drop-front Examples.

The use of the drop-front is for a subject in which the verticals must be retained while the viewpoint is above the centre of it. A few examples will make the point quite clear. A crowd outside a shop-front, photographed from ground level, will entirely hide the display in the window. If photographed from above with a reflex camera, the display will be visible but the lines of the shop necessarily will be slanting. In many such cases such slanting effect will not matter, but the drop-front of a stand camera will retain the upright lines at the same time as the inner detail of the shop

small range of swing provided on this type of camera, and partly to the fact that the swing is often still more limited when the back is not at its extreme extension, by reason of the clearance of the reversing frame above the baseboard being sometimes insufficient

If One Won't, Perhaps Its Opposite Will.

It will be realized from the foregoing that these various movements are interdependent, and limits of one should

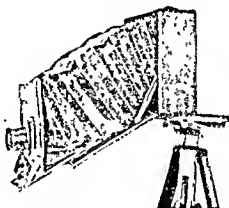


FIG. 154. REVERSING THE CAMERA ON THE STAND SOMETIMES PERMITS OF AN EXTREME TILT TO THE LENS

always be considered with regard to possible extension in another. Unfortunately, camera designers have by no means kept up with the requirements of the advanced technical worker nor with possibilities of modern lenses. One therefore has to improvise methods for oneself. For instance, the item on my list of the side swing to the camera front does not exist on any camera that I know of. The side swing to the back is only made possible for use by mechanical imperfection in construction, but it does exist, to a limited extent not always sufficient for special cases, so that on some of my cameras I have had the swing front fitted by mounting the struts on a flat metal strip which is pivoted on a central binding screw to the extension frame. A small amount of side swing to the lens does nearly the same thing as quite a

big swing to the back. For a camera which has no side swing to the back, like the one shown in Fig 15, a similar movement to the front is quite essential to much commercial work, or how could a receding subject such as Fig. 10 be sharply focused at open aperture?

Back Upright First.

Having already described how the movements of the back can be employed in combination with those of the front, it is not necessary to describe them further, excepting for one important observation. It is a very prevalent practice, born of the customs of the portrait studio, to regard the swing back as a movement with which to "correct" the uprights or for equalizing the focus, and so on, after the working of the other movements has been arranged. To my mind this is taking hold of the wrong end of the stick. If the subject is one which has vertical lines, which should appear so in the negative, it saves a tremendous amount of juggling, and of subsequent readjustment, if the back be fixed in the correct upright position to start with. If the subject is of the kind which I propose to describe next, which calls for the use of the extra drop front, shown in Figs. 13 or 15, that fact is known in advance, so that the camera can be placed so, again with the back truly vertical at the start. It should be obvious that if such an extreme amount of drop be found too much, the lens can easily be raised again as required without disturbing the body of the camera, even to the central position opposite the plate, by means of the ordinary rising-front adjustment.

Drop-front Examples.

The use of the drop-front is for a subject in which the verticals must be retained while the viewpoint is above the centre of it. A few examples will make the point quite clear. A crowd outside a shop-front, photographed from ground level, will entirely hide the display in the window. If photographed from above with a reflex camera, the display will be visible but the lines of the shop necessarily will be slanting. In many such cases such slanting effect will not matter, but the drop-front of a stand camera will retain the upright lines at the same time as the inner detail of the shop

window revealed by the elevated viewpoint, because the lowered lens will bring on to the vertical plate the part of the image desired. In this particular type of subject a slight forward swing of the lens would tend to equalize the focus as between the shop fascia and the nearer figures in the crowd but more than a slight tilt will throw more of the subject still farther above the plate than the lowered front will bring down.

Another example, which is practically identical with the shop and crowd as regards handling of the camera, is a

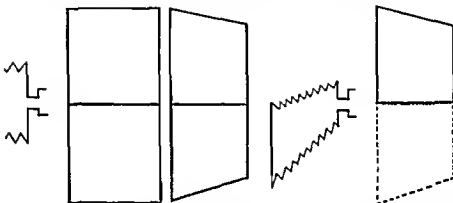


FIG. 16

FIG. 16A

FIG. 16B

HOW THE RISING-FRONT CAN BE USED FOR UNUSUAL EFFECTS IN THE STUDIO

See page 41

group around the fireside. Whether made for the sake of the portraits, or for advertising something that the people are occupied with, a high viewpoint is clearly advantageous, but it is very objectionable, in my opinion, that the sides of the fireplace should slant all sorts of ways in the photograph, as will surely happen if the ordinary kind of square-bellows camera is tilted downwards to include the children on the floor. A low viewpoint with the camera vertical will rarely give anything like so effective a lay-out, and will usually hide the fire itself. I have nothing to say against a definite "angle-shot" from well above, which makes the slanting lines positively part of the effectiveness of the picture. It is when they are just slightly out of upright against the square margins of the print that faulty "uprights" produce



FIG 20. AN INTERIOR MADE TO SHOW THE EXTENSIVE INSTALLATION OF LOW LINING LAMBS FROM A LOW VIEWPOINT WITH THE LENS RAISED

to equalize the focus between near and far detail and to include more of the detail immediately overhead.

A subject of this nature is illustrated in Fig. 20, in which the camera was placed only two or three feet above the floor, in order to show as many as possible of the low-hung lamps.

The backward swing of the front, or its counterpart, the forward swing of the back, is a movement not very often required, excepting for the purpose of obtaining the extra lens-drop, as explained and illustrated previously. The rarer occasions when the backward swing of the camera-front is used, *per se*, is when a subject has its upper part nearer the camera than the lower portions. For instance, if the camera is tilted upwards to get a view of the ceiling overhead while still including some of the distant wall, or for a garden vista in which the far-off flower beds are required to be sharp along with the near overhanging ramblers, without overmuch stopping down of the lens. It should be noted that with this movement in particular the increase in apparent perspective is often more noticeable than with many others because the nature of the subjects themselves which call for this movement usually displays plenty of perspective already. Therefore, it should not be used without caution, but there are occasions when its exaggeration can be employed to advantage. Fig. 21 shows a subject which could not be photographed quite sharply all over in the position shown, even with the smallest stops, without using this swing movement, and in which doing so considerably adds to the "effect." Fig. 53b, on the other hand, shows a somewhat similarly-shaped subject in which the disproportion so obtained would not be regarded as pleasant.

Where the Swing-front Scores.

The forward swing of the front of the camera is extremely and frequently valuable, and is, perhaps, the most important feature which makes the taper-bellows camera more efficient for much commercial work than the square form. The sole physical effect of the forward swing-front is to lengthen the camera extension at the top more than at the bottom, and thus to equalize the focus over objects at receding distances. By means of this adjustment, it becomes not only possible,

but simple in the extreme, with a lens of reasonably flat field, to secure sharp focus on foreground detail at the same time as that in the middle and far distances, using quite a large aperture in the lens. The forward swing, therefore, is useful not only in the case of groups (whether of persons or of objects) posed in front of a building in which the uprights

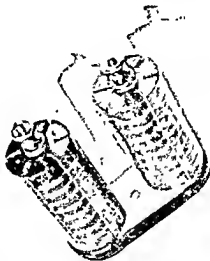


FIG. 24. USE OF SWING MOVEMENTS PROVIDES SHARP DETAIL THROUGHOUT, WHILE EXAGGERATING THE STEEPNESS OF THE ANGLE

Reflections and Brilliance. See Chapter XII

are retained true by the upright camera back, but also, for instance, in landscape work where short exposures are necessary, as well as in such subjects as interiors of factories in which people are working on receding rows of benches, laid-out tables as in banquet work, or arrangements of wedding presents or table ware. In close-up subjects where the range of distance between the nearest and the farthest detail is comparatively great, and uprights do not matter, swinging the front forward, and the back backwards, with a medium stop, will result in considerably greater "depth-of-focus" than is possible with the minutest stops used without these movements.

And the Side-swing.

The side-swing, either of front or back, is for use in somewhat similar fashion to the foregoing, when the subject is nearer at one side than at the other. For instance, the everyday example of a row of houses, photographed at an angle; a piece of furniture similarly angled, or, indeed, any other subject in which important detail is nearer at one side than at the other, and the use upon which of the smallest stops is undesirable. Fig. 73 is one example; Fig. 30 affords three examples in which a side-swing has been used with advantage. Fig. 10 exemplifies a subject in which the need of a short exposure to "stop movement" necessitated using the open aperture of $f/4.5$ in the lens, and in which, by slightly swinging the camera back sideways, the focus was equalized over the whole of the building. Any illustration in this book in which detail at one side of the picture is nearer than that at the other side, and in which both are sharp, has probably occasioned the use of the side-swing, either of the front or of the back, of the camera.

The reasons why I personally prefer the front panel rather than the back to swing sideways (and have had several cameras altered to provide that special movement) are firstly, because a little lens swing does more than a whole heap of back swing (in fact, more than is usually available), and secondly, because it comes easier to me to use. All I do in practice is to get hold of the front panel, and to swing it more parallel with the front line of the subject, and so with other movements. One gets in the habit of moving the front panel to meet the subject, as it were, whereas moving the back of the camera means not only frequently upsetting its vertical adjustment, which is waste of time, but one has to work it at angles opposite to those at which the subject recedes, which introduces each time a sort of problem which my slow-working mind has to grapple with and provide in instructions to my hands to carry out. Whereas to swing a lens panel round and over to meet the subject is a thing that one just does subconsciously while looking at the image.

Movements Increase "Perspective."

It should here be again emphasized that employment of these various swing movements necessarily increases the

(or objects arranged like a hill), and the lens swung forward over it will equalize the focus over it. Next lay the board flat (a garden, a laid table, an open book, a game of chess) and a still more forward swing will again do the trick. If the board is then skewed (*similar subjects taken at an angle*) the lens is made to follow its centre, just as one would turn one's eye if one's head were fixed. In fact, I have found some people get bewildered by the peculiar behaviour of the image on the focusing-screen when they begin to employ some of these various movements more freely than they have been used to doing. This results from either of three inexcusable mistakes, viz. (1) guessing at the amount of swing, etc., to use and thereby overdoing it; (2) again guessing and using the movement exactly the reverse way to what is needed; or (3) using them in the wrong order, in which case one will often partially undo the work of the previous movement.

Work in this Order.

The best order to work in is as follows

If the subject needs drop-front, i.e. high viewpoint plus uprights, fix the camera as Fig. 13. (Note, you can always slide the front up if the extreme drop is found to be too much.)

Next (or if the drop-front is not needed, first) upright the back. If the subject recedes sideways, use the side-swing, either of the back or, if your camera has it, of the front, so that the side of the camera carrying the nearest detail has the longer extension.

Lastly, the front forward swing if the subject slopes away from you.

Little by Little v. Much too Much.

In actual operation the swing movements should be handled like this: get the binding screws and struts slack so that one hand can move them steadily but positively without looseness. Then hold the focusing pinion in the other hand. Having got a rough focus on the subject, make a small amount of swing, and again correct the focus; a little more swing, and again focus, and so on, till the line selected is sharp all along. This line will usually be the nearest line of essential detail for the side swing, and the

angle of perspective. That is to say, that the resulting steepness or effect of distance is similar to the effect ordinarily produced by getting closer to the subject and using a shorter focus lens. In extreme cases injudicious use of movements can produce definitely false perspective. Therefore, it is necessary to employ them with caution, and very often it is better to compromise by partly equalizing the sharpness by the movements, and getting the rest by stopping down. The whole point of swing movements is that, on the one hand, they permit of larger apertures than would in their absence be necessary, and on the other that very often, especially in close-up work with long-focus lenses, they enable sharp detail to be obtained throughout a subject which would be in their absence absolutely impossible even with a pinhole stop and the inordinately long exposure that each would require.

Anyone unacquainted with the ready handling of these various movements is recommended to acquire such readiness by a little practice (actual exposures being not essential) on each of them independently.

Movements in Combination.

As soon as one has become familiar with the free use of movements for the purposes outlined above, it will be clear that it is frequently practicable to use them in combination. For instance, if the principal details of a subject recede from one side to the other as well as (at the same time) from near in front to far at the back, one is enabled to use a long focus lens to avoid too abrupt falling off in size of the more distant objects while still getting them all sharp at a fairly large aperture. In practice the best use of the movements is obtained by first deciding (which is instantly possible) whether or not the uprights matter, in which former case the back is fixed upright to start with, and then carefully to note the plane in which the principal details lie. When that has been decided, the lens is turned somewhat towards the axis of this plane. If one can get into the habit of imagining a flat board on which these details are fixed, one can visualize how the lens must follow it round. For instance, a flat board hung on a wall would need the lens pointing straight at it. Now slope the board slightly backward to represent a hill

(or objects arranged like a hill), and the lens swung forward over it will equalize the focus over it. Next lay the board flat (a garden, a laid table, an open book, a game of chess) and a still more forward swing will again do the trick. If the board is then skewed (similar subjects taken at an angle) the lens is made to follow its centre, just as one would turn one's eye if one's head were fixed. In fact, I have found some people get bewildered by the peculiar behaviour of the image on the focusing-screen when they begin to employ some of these various movements more freely than they have been used to doing. This results from either of three inexcusable mistakes, viz. (1) guessing at the amount of swing, etc., to use and thereby overdoing it; (2) again guessing and using the movement exactly the reverse way to what is needed; or (3) using them in the wrong order, in which case one will often partially undo the work of the previous movement.

Work in this Order.

The best order to work in is as follows

If the subject needs drop-front, i.e. high viewpoint plus uprights, fix the camera as Fig. 13. (Note, you can always slide the front up if the extreme drop is found to be too much.)

Next (or if the drop-front is not needed, first) upright the back. If the subject recedes sideways, use the side-swing, either of the back or, if your camera has it, of the front, so that the side of the camera carrying the nearest detail has the longer extension.

Lastly, the front forward swing if the subject slopes away from you.

Little by Little v. Much too Much.

In actual operation the swing movements should be handled like this: get the binding screws and struts slack so that one hand can move them steadily but positively without looseness. Then hold the focusing pinion in the other hand. Having got a rough focus on the subject, make a small amount of swing, and again correct the focus; a little more swing, and again focus, and so on, till the line selected is sharp all along. This line will usually be the nearest line of essential detail for the side swing, and the

centre line from front to back for the *forward* swing. By means of a swift succession of small adjustments in the right order, a positive result is obtained in a few seconds that would take several minutes of the more usually adopted haphazard fumbling!

It takes very little definite practice of this sort before one becomes accustomed, automatically and subconsciously, as I remarked just a little earlier, to swing the lens panel over to meet the slopes of the subject, or of the principal details in it.

I am only too well aware that in many subjects the principal details do not by any means lie in one plane in which case the operator must decide either to compromise in the degree of movement employed, or manage without them by considerably stopping down his lens. There are few subjects in which they cannot be used to some advantage, and very many which can hardly be satisfactorily photographed without them.

CHAPTER IV

TIME- AND TROUBLE-SAVING ACCESSORIES

ONE important matter connected with the commercial photographer's equipment is attention to the many apparently *minor details which can help him a very great deal in the rapid and confident execution of his work.* Time is of the very greatest importance to him. Not only does he need to get each operation over quickly, in case some unexpected incident interferes with success, such as a sudden shower of rain, or the arrival of a crowd of school-children on the scene, or a hundred and one other things incidental to various kinds of work, but it should always be remembered that time is the principal cost of producing photographs. The saving of the need for duplicate exposures is quite important too, but even more costly than the extra material is the time that such duplicates occupy, from loading of the slides to the examination of the negatives. The combined cost of the materials and of time expended on this one item of duplicated exposures can tot up to a quite astonishing amount in the course of a year. Anyone who doubts this should check it for one week only, and multiply the result by 52.

Therefore, anything that will add to the self-confidence required to be satisfied with one exposure per subject as the normal standard will be a definite investment, and so will anything in apparatus, or the method of handling it, that will save an hour a day to be turned to producing more work.

This chapter will be devoted to a few ideas that will help, if ever so little in each case, to that end.

Have Lenses Interchangeable.

One of the most useful ideas I have ever adopted is that of having practically any lens available for instant use upon any camera. There are several ways of achieving this. One method, when the equipment is not too comprehensive, is to have screw flanges made to fit all but the largest of one's lenses, with one standard outer dimension to fit the one big

centre line from front to back for the *forward* swing. By means of a swift succession of small adjustments in the right order, a positive result is obtained in a few seconds that would take several minutes of the more usually adopted haphazard fumbling!

It takes very little definite practice of this sort before one becomes accustomed, automatically and subconsciously as I remarked just a little earlier, to swing the lens panel over to meet the slopes of the subject, or of the principal details in it.

I am only too well aware that in many subjects the principal details do not by any means lie in one plane, in which case the operator must decide either to compromise in the degree of movement employed, or manage without them by considerably stopping down his lens. There are few subjects in which they cannot be used to some advantage, and very many which can hardly be satisfactorily photographed without them.

CHAPTER IV

TIME- AND TROUBLE-SAVING ACCESSORIES

ONE important matter connected with the commercial photographer's equipment is attention to the many apparently minor details which can help him a very great deal in the rapid and confident execution of his work. Time is of the very greatest importance to him. Not only does he need to get each operation over quickly, in case some unexpected incident interferes with success, such as a sudden shower of rain, or the arrival of a crowd of school-children on the scene, or a hundred and one other things incidental to various kinds of work, but it should always be remembered that time is the principal cost of producing photographs. The saving of the need for duplicate exposures is quite important too, but even more costly than the extra material is the time that such duplicates occupy, from loading of the slides to the examination of the negatives. The combined cost of the materials and of time expended on this one item of duplicated exposures can tot up to a quite astonishing amount in the course of a year. Anyone who doubts this should check it for one week only, and multiply the result by 52.

Therefore, anything that will add to the self-confidence required to be satisfied with one exposure per subject as the normal standard will be a definite investment, and so will anything in apparatus, or the method of handling it, that will save an hour a day to be turned to producing more work.

This chapter will be devoted to a few ideas that will help, if ever so little in each case, to that end.

Have Lenses Interchangeable.

One of the most useful ideas I have ever adopted is that of having practically any lens available for instant use upon any camera. There are several ways of achieving this. One method, when the equipment is not too comprehensive, is to have screw flanges made to fit all but the largest of one's lenses, with one standard outer dimension to fit the one big

flange, as illustrated in Fig. 22. When the range of apparatus is greater, the best plan is to decide on one standard size and thickness of square lens panel, and to have one such panel for each lens, a rebated frame being cut on each camera and

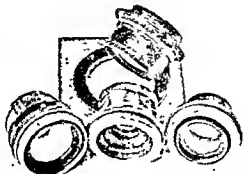


FIG. 22. THE THREE LOWER LENSES CARRY SCREWED FLANGES TO FIT THE FLANGE OF THE UPPER ONE
This saves carrying loose panels

enlarger front to take the same. Good-quality plywood, cut accurately to a square fit, is thoroughly sound for this purpose, and there is no reason at all for a rebated edge to any



FIG. 23. SQUARE PANELS ALLOW ALL LENSES TO BE USED INTERCHANGEABLY ON ALL APPARATUS

panel. By this method it becomes practicable, should a job crop up requiring the use of, say, a rapid lens that is out on another job, for the enlarger lens to be instantly requisitioned to fill its place. It can be a most annoying, and even a disastrous occurrence to find that a certain lens one

suddenly would like to use in the studio, or to make some reduced lantern-slides through the enlarger, will only fit the one camera front it was bought with.

The square shape is advantageous in several ways. The first is that a panel will go right into place quickly any way up that it comes to hand. If one happens to be working in close or awkward quarters, and wants the diaphragm numbers to be visible at either side, or from above or below, this can be arranged instantly anywhere, and with the eccentric panel, shown in the little group, the square shape obviously is essential for employing the lens in the upper or lower position at will.

Fig. 23 shows a small selection of such interchangeable panels. It may be noted that in one case (second from the left) the hole is chamfered and the lens-flange is fixed at the back. The intention of this



FIG. 24. AN IRIS LENS ADAPTER IS EXTREMELY USEFUL ON A COPYING CAMERA, OR IN THE STUDIO

is to accommodate an extremely short-focus lens while still leaving just a little flexibility in the camera bellows to allow for using the rising front. The first panel in which the flange is fixed eccentrically is for carrying a particular wide-angle lens of a little longer focal length than the foregoing, which is very often used on subjects which call for the limits of rise or fall. In such cases the extra $\frac{3}{4}$ in., obtainable by setting the panel with the flange high or low, is extremely valuable, and the camera adjustments are not upset by strain on the bellows.

For use on a studio or copying camera, the iris adapter (see Fig. 24) is a very useful accessory, but it is not quite so adaptable to the outdoor camera, especially in the case of one used for wide-angle work, because it carries the lens

forward by about $\frac{1}{2}$ in from the panel. The iris opens and closes on to the lens mount by turning one of the thumb-



FIG 25 A TRIPOD STAY OF OAK LATHS ENSURES SAFETY ON THE MOST SLIPPERY FLOOR

screws, and the other one clamps it to prevent accidental loosening.

To Prevent a Tripod from Slipping.

Those photographers who still favour the folding tripod will know that there are many floors upon which its safety

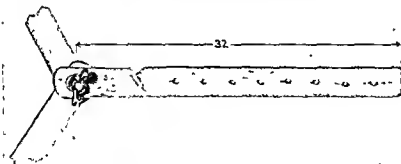


FIG. 26. TRIPOD STAY OF OAK LATHS

The method of constructing the tripod stay is simple in the extreme

is not too well assured. Still more often does it occur that after setting up the camera it is desired to turn it one way or the other with the consequence that one has to make all the adjustments of the legs for accurate levelling over again.

Both these troubles can be avoided quite easily by means of a tripod stay, a simple device well known to the older generation of photographers. It consists, as Figs. 25 and 26 clearly show, of three laths of some hard wood, each about 30 in. long, all pierced at one end for a bolt and fly-nut, and for a few inches at the free ends with small holes at intervals of about 1 in. apart. This device, when laid upon the floor with the arms extended, allows of very free adjustment of the tripod, and when locked by tightening the central fly-nut, not only prevents any chance of slipping, but allows the camera to be moved about the floor from one place to another, as required, without altering its adjustments in the least. Strapped to the collapsed tripod, it takes hardly any extra space (Fig. 27).

Shutters.

Among shutters probably the best all-round for the commercial worker is of the type that gives a "bulb" exposure only, and is adjustable for a number of lenses. For the few occasions when he requires instantaneous exposures, a small hand camera of the reflex or the folding type will be useful, but it is certainly very inadvisable to limit, in the very slightest degree, the adaptability of his standard apparatus by the inclusion of a feature that is rarely needed. The focal-plane shutter is bulky upon a stand camera and renders wide-angle work impossible, and a good diaphragm shutter does not conduce to rapid interchange of lenses, while the type of shutter previously mentioned allows of snaps quite rapid enough for portraiture of humans and of most animals.

The Changing-bag.

A very useful piece of outdoor equipment is the changing-bag.



FIG. 27
WHEN FOLDED UP
THE STAY IS STRAPPED
TO THE TRIPOD FOR
CARRYING
(Can you see anything
wrong with this illustration?
If not, see page 187)

This should be of ample size to permit of laying out slides and plate-boxes comfortably. The largest bag causes hands to get warm during operations so that a too small one conduces to fluster and finger-marks. Since a well-

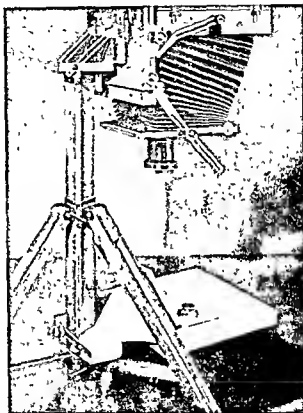


FIG 28 AN EASILY-MADE COPYING ATTACHMENT FOR
"HOME PORTRAIT" STAND
Made of plywood and useful also for photographing small objects

designed changing-bag can be used as a focusing-cloth the extra space it occupies in the kit is largely discounted. On the smallest job it should be the rule to carry more plates than will be required. The occasions when clients discover additional requirements while the photographer is on the spot are quite numerous. Sometimes it is possible to suggest these extra pictures oneself. Not in the traditional

manner of the grocer or the hairdresser, however; the photographer is out for greater returns than the profit on a packet of tea, and must therefore study the methods of higher forms of diplomacy!

A very useful article to carry, in this connection, is a bit of thin mounting board, cut to fit just inside the reversing back of one's camera so as to cover half the plate. When the supply of plates runs short, it is possible to take two subjects on a smaller scale, one upon each half of a plate, by covering each side in turn. If carefully done, the results can be afterwards enlarged to the size ordered. This entails more trouble, of course, and is not a plan to be adopted for regular work, for many reasons, but it is far better than suggesting a return visit, which would only meet, often, the counter-suggestion that the extra pictures were not really so important. Such a piece of card at the bottom of each camera case is never noticed till wanted, and in the writer's case earns a few pounds every year! A sleeping partner who produces profits but exacts no dividends!

Lens Hoods.

When choosing, or making, lens hoods, the commercial photographer should remember that a hood close to the lens may be easily worse than useless. When employing such movements as the rising front, for example, or any other that shifts the lens axis from its central position upon the plate, the edge of a small hood will enter into the field of view and will tend to cut off, more or less abruptly, some portion of the subject. This "cut-off" is often not noticed till the lens is stopped down, when it "comes in" suddenly. Therefore, in using a hood, unless the lens is fixed centrally one should never "chance" stopping down without re-examining the ground-glass. Again, when used as a sunshade, it may be noticed that the strong light catches the lower inside portion of the hood, and the reflected glare may cause almost as much degradation of image as the direct rays one has desired to shield the lens from. The type of hood chosen, therefore, should be ample in size, and it is all the better if there is an inturned lip or ridge at the opening which will display a shadow of extreme blackness around the opening, on the inside towards the lens.

Focusing Helps.

Many cameras are issued, even by makers of the highest grade, with focusing-screens of the commonest ground-glass. Why this should be the case is rather difficult to understand since a coarse screen is anything but a help in securing results that should enhance the repute of an expensive camera, or justify its price. The finest acid-etched is really the only kind that should be tolerated, and it is sold under various names by most of the wholesale houses. Even this is improved in translucence by rubbing vaseline



FIG. 29 THE FOCUSING MAGNIFIER

Cutting away the mount allows of getting end-on examination of oblique rays.
Invaluable in dim interiors and for close-ups of dark objects

all over, and then removing as much as possible of the grease with a dry cloth. This improvement is much appreciated when the image is dim by reason of small apertures or other causes.

Another great help to keen focusing is a magnifier, but a really good achromatic one should be chosen. A great advantage is to have the mount cut away (Fig. 29) so that the glass can be slanted upon the ground-glass in alignment with the oblique rays from the lens. The improvement when focusing marginal details in dim light is really astonishing. Similarly, when photographing interiors in such conditions that the eye cannot be got sufficiently to one side or other, it may be difficult not only to focus, but even to see how much of the subject is included. Here a little mirror is useful, enabling the image to be viewed (under the black cloth, of

course) from the other side. It takes a little experiment to be able to do this easily, and it has been found helpful to carry a concave dental mirror, costing only a shilling or so, for this purpose. When an interior is so dark that focusing from one point to another becomes extra difficult, the trouble is transformed into child's play by arranging a few lights around essential positions. These can be bits of candle, or

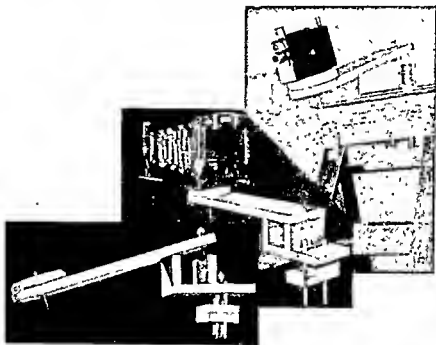


FIG. 30. AN EASILY-MADE BRACKET WHICH ALLOWS A STAND CAMERA OR A SMALL CINE CAMERA TO BE SECURED IN UNCONVENTIONAL POSITIONS

naked electric bulbs, not forgetting that pocket "flash-lamps" are handy and can be placed anywhere. Focusing is performed upon the actual flames or filaments with the certainty that surrounding detail will be equally sharp upon the negative.

The average focusing-cloth of the photographic dealer is not by any means ideal for its purpose. Why it should have one side red has been a riddle to the writer for over a third of a century. Two yards of 40 in. black sateen, doubled

and hemmed up make an absolutely opaque and comfortable cloth for half- or whole-plate work. A great advantage is to have a few dress-fasteners sewn along each edge near the corners. If stitched on properly with thread they will never come off and can be snapped together to hold the cloth



FIG. 31. A THIN STRUT TO THE EXPOSURE METER MAKES IT STAND UP FOR USE
In weak light other work can be proceeded with meanwhile



FIG. 32 A HOLE AT THE TOP OF THE STRUT ALLOWS THE METER TO BE PINNED UP ALONGSIDE A PICTURE

conveniently over the camera in a wind, or for a long exposure indoors. A material of good quality will last as long as a camera.

Useful for "Angle-shots."

For certain rather specialized occasions the piece of home-made gear, shown in Fig. 30, has proved definitely advantageous. Originally devised for securing angle-shots with a 16-mm. cine camera from a high vantage point, such as that of an upper window, this easily-constructed bracket will afford a secure support for quite a substantial field-camera. Its advantage here is that the conventional stand holds a camera just within the window-frame, where it becomes difficult at times to secure the desired view clear of the

masonry at the sides, and in some cases even of the window-sill below. The man who makes views of street scenes will appreciate the point of this feature. Another branch in which the bracket has been found useful is when a considerable number of engravings were to be copied at the client's premises. Fixed to the table, the camera can more easily be adjusted and retained in square-on relation to the varying sizes of originals than with any ordinary camera stand.

Let the Meter Hold Itself.

An exposure meter is a *sine qua non* with much technical work, more especially, of course, when a filter, either for correction or for colour-reproduction, is used on the lens. The attachment of a brass strut to the ring of the meter (Fig. 31) is a considerable advantage, while taking up no extra space in the pocket since it lies flat against the back of the case when out of use. The strut allows the meter to be stood up, when the tint is likely to take some time in darkening, so that other preparations can be got on with in the meantime. The very thin chisel-end also permits of just wedging the strut between the glass and frame of a picture sufficiently to hold the meter in place. The photo-electric, and visual-extinction types of meter are of less application to the work of commercial photography than to cinematography, since they do not, as a rule, give useful readings when conditions forbid rapid exposures. The "Justophot" is the only exception with which I am familiar.

The Photographer's Best Friend.

A good spirit-level affords the most rapid means of securing perfect "uprights" in architectural and other work, in which they are essential (see page 123). The most convenient kind of level universally obtainable is the "boat-shape," seen in Fig. 33. It is the small "cross-level" at the end which is the essence of its virtues for the commercial photographer. Since this level is more bulky than it might be for inclusion in an outdoor "kit," I have for my own use the little one seen alongside it in the same illustration. The circular level is actually designed for clipping on to a steel ruler, and can be bought at most tool shops for about 3s. 6d. In

place of the ruler, I had a small piece of hard aluminium cut to an accurate right-angle, and a hole drilled so that the



FIG. 33. TWO USEFUL SPIRIT-LEVELS

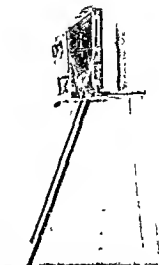


FIG. 34. WHERE SPACE IS AT A PREMIUM, SUPPORT THE CAMERA AGAINST THE WALL LIKE THIS, FOR MAKING AN INTERIOR

binding-screw goes right through it to afford a permanent hold.

Unipod!

It is seldom realized that, without needing any special piece of apparatus, many field cameras can be supported against a wall by means of one leg only of the tripod. This is an invaluable dodge when it is desired to obtain the maximum amount of detail at the sides of a cramped interior, and is a particularly suitable method of supporting, in such cases, the wide-angle camera illustrated on page 15. To obtain a higher point of view, the point of the single leg can be placed on a chair or table with every confidence. The wall being vertical, it is only necessary to level the camera

at one side, in this case, but for an ordinary pattern, such as is shown in Fig. 34 illustrating this idea, the back of the camera should be levelled both ways, unless an angular view be required. It is noteworthy that this single-leg support is equally suitable, and even more safe, when the camera is in the corner between two walls.

Dark-slide Numbers.

There is a small point about book-form dark slides that seem to have been missed by some camera makers, but that

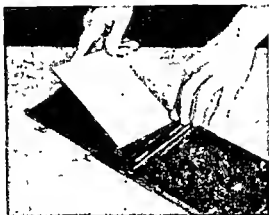


FIG. 35. THE HALF OF A SLIDE WHICH CARRIES THE CLIPS SHOULD CARRY ALSO THE "ODD" NUMBER

can easily be corrected for oneself. Reference to Fig. 35, which shows a plate being filled into a slide (incidentally it shows also how a finger-tip placed at one corner of the rebato assists in rapid and accurate loading in total darkness), will show that usually the hinged partition is on the opposite side of the slide to that bearing the fastening clips, which is as it should be. It will be clear also that the plate on the open half, i.e. *not* the one under the partition, will be the first one to be easily taken out after exposure, and should therefore be the one first exposed. Therefore, the side of the slide bearing the clips should have the *odd* number, so that it shall be the first side exposed. Unfortunately, this is not always the case, but it is easy to pick out the little ivory labels, and re-glue them in correctly.

place of the ruler, I had a small piece of hard aluminium cut to an accurate right-angle, and a hole drilled so that the



FIG. 33. TWO USEFUL SPIRIT-LEVELS

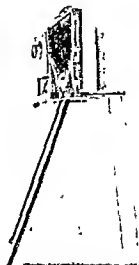


FIG. 34. WHERE SPACE IS AT A PREMIUM, SUPPORT THE CAMERA AGAINST THE WALL LIKE THIS, FOR MAKING AN INTERIOR

binding-screw goes right through it to afford a permanent hold.

Unipod!

It is seldom realized that, without needing any special piece of apparatus, many field cameras can be supported against a wall by means of one leg only of the tripod. This is an invaluable dodge when it is desired to obtain the maximum amount of detail at the sides of a cramped interior, and is a particularly suitable method of supporting, in such cases, the wide-angle camera illustrated on page 15. To obtain a higher point of view, the point of the single leg can be placed on a chair or table with every confidence. The wall being vertical, it is only necessary to level the camera

at one side, in this case, but for an ordinary pattern, such as is shown in Fig. 34 illustrating this idea, the back of the camera should be levelled both ways, unless an angular view be required. It is noteworthy that this single-leg support is equally suitable, and even more safe, when the camera is in the corner between two walls.

Dark-slide Numbers.

There is a small point about hook-form dark slides that seem to have been missed by some camera makers, but that

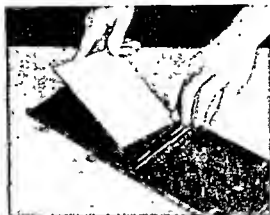


FIG. 35. THE HALF OF A SLIDE WHICH CARRIES THE CLIPS SHOULD CARRY ALSO THE "ODD" NUMBER

can easily be corrected for oneself. Reference to Fig. 35, which shows a plate being filled into a slide (incidentally it shows also how a finger-tip placed at one corner of the rebate assists in rapid and accurate loading in total darkness), will show that usually the hinged partition is on the opposite side of the slide to that bearing the fastening clips, which is as it should be. It will be clear also that the plate on the open half, i.e. *not* the one under the partition, will be the first one to be easily taken out after exposure, and should therefore be the one first exposed. Therefore, the side of the slide bearing the clips should have the *odd* number, so that it shall be the first side exposed. Unfortunately, this is not always the case, but it is easy to pick out the little ivory labels, and re-glue them in correctly.

place of the ruler, I had a small piece of hard aluminium cut to an accurate right-angle, and a hole drilled so that the



FIG. 33. TWO USEFUL SPIRIT-LEVELS

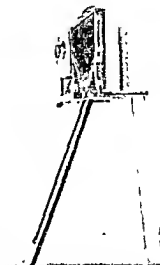


FIG. 34. WHERE SPACE IS AT A PREMIUM, SUPPORT THE CAMERA AGAINST THE WALL LIKE THIS, FOR MAKING AN INTERIOR

binding-screw goes right through it to afford a permanent hold.

Unipod!

It is seldom realized that, without needing any special piece of apparatus, many field cameras can be supported against a wall by means of one leg only of the tripod. This is an invaluable dodge when it is desired to obtain the maximum amount of detail at the sides of a cramped interior, and is a particularly suitable method of supporting, in such cases, the wide-angle camera illustrated on page 15. To obtain a higher point of view, the point of the single leg can be placed on a chair or table with every confidence. The wall being vertical, it is only necessary to level the camera

at one side, in this case, but for an ordinary pattern, such as is shown in Fig. 34 illustrating this idea, the back of the camera should be levelled both ways, unless an angular view be required. It is noteworthy that this single-leg support is equally suitable, and even more safe, when the camera is in the corner between two walls.

Dark-slide Numbers.

There is a small point about book-form dark slides that seem to have been missed by some camera makers, but that

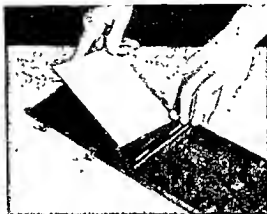


FIG. 35. THE HALF OF A SLIDE WHICH CARRIES THE CLIPS SHOULD CARRY ALSO THE "ODD" NUMBER

can easily be corrected for oneself. Reference to Fig. 35, which shows a plate being filled into a slide (incidentally it shows also how a finger-tip placed at one corner of the rebate assists in rapid and accurate loading in total darkness), will show that usually the hinged partition is on the opposite side of the slide to that bearing the fastening clips, which is as it should be. It will be clear also that the plate on the open half, i.e. *not* the one under the partition, will be the first one to be easily taken out after exposure, and should therefore be the one first exposed. Therefore, the side of the slide bearing the clips should have the *odd* number, so that it shall be the first side exposed. Unfortunately, this is not always the case, but it is easy to pick out the little ivory labels, and re-glue them in correctly.

The advantages of seeing to this are many. First of all, one gets into the subconscious habit of arranging slides in

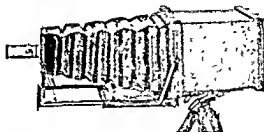


FIG. 36. AN EXTENSION BOX PROVIDES AN EXTRA EXTENSION OF GREAT RIGIDITY FOR TELEPHOTO AND SIMILAR WORK.

the bag and on the loading bench all one way, and of exposing the side on which are the clip hinges first, even when the



FIG. 37. DUMMY ENDS ALLOW THE EXTENSION BOX TO BE USED AS A CARRYING-CASE, THUS ASSISTING TOWARDS PORTABILITY

need for hurry makes one ignore the numbers. Afterwards, if there be a single unexposed plate in a slide, there will be



FIG. 38. EASILY-MADE BOARD OF PLYWOOD, ON WHICH LONG LENGTHS OF FLEX ARE WOUND WITHOUT FEAR OF KINKING

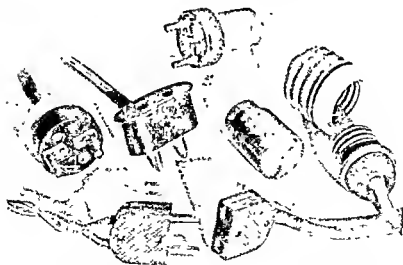


FIG. 39. A FEW USEFUL PLUGS FOR THE PHOTOGRAPHER WHO CARRIES PORTABLE LAMPS

They afford a means of connection with almost any ordinary supply

no doubt as to which side it is on, for the exposed plate will come out first for development.

Extension-box.

For telephoto work, and for photographing very small objects with a field camera, an extension-box is often superior to great bellows extension on account of its greater rigidity.

By means of a false top and bottom, the extension-box can be used in place of a carrying case for some of the gear when



FIG. 40. A SMALL NEAT TRAY, EASILY MADE OF PLYWOOD, WHICH CARRIES LENSES, AND OTHER LOOSE ODDMENTS, IN THE OUTDOOR KIT

working away from the studio, and therefore does not become an extra article to carry.

Oddment Tray for the Outdoor Kit.

One of the greatest bugbears of an outdoor kit consists in having a jumble of lenses and other gear lying loose among the dark slides in the case from which the camera has been withdrawn. A neat tray, as illustrated in Fig. 40, will conveniently accommodate all the small items without risk of damage. Its dimensions should be such that it will occupy the space in the packed case left above the dark slides beside the camera. When the latter is taken out for use, the tray is placed in its stead, leaving the slides free without any liability to flop about in the case. The lenses to be carried already screwed into the tray, and this saves a lot of time on some jobs.

CHAPTER V

STUDIO EQUIPMENT

MANY commercial photographers have no studio, and need none, their subjects being confined to those which take them away from their own premises. In other cases the studio arrangements may range from a small bench near a window for the occasional photographing of a few small objects to a vast palatial building, full of the most elaborate scenic and lighting arrangements, into which a row car can be driven and photographed with all the incidental ingredients of a picnic or of an aristocratic garden party!

Consequently, one might easily fill several books of this size with descriptions of how such a variety of studios can be installed, and of details of equipment that could usefully find a place therein. One must therefore be satisfied to describe some of the principal requirements for certain types of work, and to make such comments as may be generally acceptable.

Space More Important Than Size.

The size of the room available must necessarily govern not only what equipment can find space in it, but must set a limit to the kinds of work that can be successfully attempted therein. Even if nothing more ambitious than simple catalogue work, that is, straightforward photography of objects, be aimed at, there are such things as pieces of furniture, radio-gramophones, and the like, which need not only plenty of space between camera and object to avoid painful perspective, but also ample room sideways to allow of arranging the lighting to suit each subject. Nor does an operator feel happy if most of his working space is occupied with the goods that are waiting to be photographed, or that he has finished with. I would say, roughly, that for such large objects a room 20 ft. by 12 ft. is none too spacious, and would not permit of much variation of treatment upon them. On the other hand, for smaller subjects such a room would be ample. Much good work on small objects can be

no doubt as to which side it is on, for the exposed plate will come out first for development.

Extension-box.

For telephoto work, and for photographing very small objects with a field camera, an extension-box is often superior to great bellows extension on account of its greater rigidity.

By means of a false top and bottom, the extension-box can be used in place of a carrying case for some of the gear when



FIG. 40. A SMALL NEAT TRAY, EASILY MADE OF PLYWOOD, WHICH CARRIES LENSES, AND OTHER LOOSE ODDMENTS, IN THE OUTDOOR KIT

working away from the studio, and therefore does not become an extra article to carry.

Oddment Tray for the Outdoor Kit.

One of the greatest bugbears of an outdoor kit consists in having a jumble of lenses and other gear lying loose among the dark slides in the case from which the camera has been withdrawn. A neat tray, as illustrated in Fig. 40, will conveniently accommodate all the small items without risk of damage. Its dimensions should be such that it will occupy the space in the packed case left above the dark slides beside the camera. When the latter is taken out for use, the tray is placed in its stead, leaving the slides free without their usual liability to flop about in the case. This tray often allows lenses to be carried already screwed into their panels, and this saves a lot of time on some jobs.

CHAPTER V

STUDIO EQUIPMENT

MANY commercial photographers have no studio, and need none, their subjects being confined to those which take them away from their own premises. In other cases the studio arrangements may range from a small bench near a window for the occasional photographing of a few small objects to a vast palatial building, full of the most elaborate scenic and lighting arrangements, into which a new car can be driven and photographed with all the incidental ingredients of a picnic or of an aristocratic garden party!

Consequently, one might easily fill several books of this size with descriptions of how such a variety of studios can be installed, and of details of equipment that could usefully find a place therein. One must therefore be satisfied to describe some of the principal requirements for certain types of work, and to make such comments as may be generally acceptable.

Space More Important Than Size.

The size of the room available must necessarily govern not only what equipment can find space in it, but must set a limit to the kinds of work that can be successfully attempted therein. Even if nothing more ambitious than simple catalogue work, that is, straightforward photography of objects, be aimed at, there are such things as pieces of furniture, radio-gramophones, and the like, which need not only plenty of space between camera and object to avoid painful perspective, but also ample room sideways to allow of arranging the lighting to suit each subject. Nor does an operator feel happy if most of his working space is occupied with the goods that are waiting to be photographed, or that he has finished with. I would say, roughly, that for such large objects a room 20 ft. by 12 ft. is none too spacious, and would not permit of much variation of treatment upon them. On the other hand, for smaller subjects such a room would be ample. *Much good work on small objects can be*

done in a surprisingly narrow compass, but a large room not only allows of unhampered movement, both for the operator and for his camera and lamps, but also permits him to prepare a batch of subjects in various parts of the room so that they can be photographed in rapid succession when ready

Lighting Capacity.

Much also depends upon the capacity of the lighting available. Few commercial photographers can afford, any more than the portraitist, to be dependent upon the fluctuations of daylight, more especially as they have often to stop lenses down and use deep filters, and do other things which can prolong exposures to a length which is outside ordinary commercial practicality, to say nothing of the fact that modern traffic conditions often interfere, by their continuous vibration, with the results from long exposures in many city streets.

Provided he is satisfied with a limited range of lightings, and always uses his lamps fairly close to the subject, quite speedy and satisfactory work on small still subjects can be done with half-a-dozen 100-watt lamps, or with one 500-watt lamp and a white reflector. Directly anything in the nature of a spotlight is added to the lighting equipment, the latter must necessarily be raised in capacity in proportion, otherwise the parts of negatives receiving spotlight illumination will necessarily be too much over-exposed in comparison with the parts receiving normal illumination. As soon as one begins to bring the lighting, *added to the current used for work in other departments*, such as in the enlarger, to over 2,000 watts, special note must be made as to the capacity of the meter and of the wiring therefrom. Where the meter is on a branch from the main, as in many city offices, the capacity of the cable from the main itself should be inquired into. For instance, the installation of the very (and deservedly) popular "Northlight" studio arc involves the consumption of about 35 amps. An ordinary lighting circuit will rarely carry more than a total of 5 or 6 amps., and even the "power" circuit for radiators is usually only wired and metered for 10 amps. For such a large studio lamp, therefore, a special cable and meter would be necessary if such large carrying capacity had not previously been installed. The electric

supply company will usually advise as to the strength of cable, and so on, required to carry any stated total "load" safely.

Voltage Fluctuations.

Much has been written about the supposed drop in actinic value of the electric light when the supply falls off, as every service does occasionally, in voltage. There are laws intended to prevent this, but they do not go very far to benefit the photographer who suffers by illegal fluctuations in current, whether caused by irregular supply or by other users switching on and off a large quantity at once. It is quite useful to keep in the studio a voltmeter, which can be switched on occasionally as a guide to the value of the current passing at the time, but it is worthy of note in this connection that when rapid panchromatics are used, these fluctuations are of less account than with other material, and also that the use of long lengths of flex between lamp and supply point do at least as much to lower the voltage as the outside circumstances previously discussed.

Arcs or Gas-filled Lamps.

Of gas-filled lamps and spotlights there are patterns in profusion to select from, and for all sorts of purposes in the studio, as well as for use away from headquarters. It is not for me to recommend any individual piece of apparatus out of so many that have each their individual attractions. For portable purposes, however, one has the choice between open arcs of various capacities, each adapted by means of an adjustable resistance to a variety of voltage supplies and certain types of gas-filled lamp, each made for an individual voltage. If one is restricted, either by the amount of business that warrants the outlay, or for any other reason, to one type of portable lamp (which may well be part of the studio installation when not on duty elsewhere), one is compelled to weigh between the following considerations.

A portable arc of the larger size to take about 10 amperes is very powerful, but will not work safely from the ordinary lighting wiring of a client's house or office. It has to be worked from the "power" (i.e. in a house the radiator) supply point, if any.

Even a 6-amp. arc may not always work from the usual 5-amp. house supply without needing insertion of a new fuse wire, or without care not to run the lamp for long periods. This is especially the case if the wiring appears to be old, and the attachments not of first-rate soundness.

In any case, one may come across clients who have a fancy, real or imaginary, that the open flame may be dangerous to their carpets. One may find a fire insurance inspector look upon an open arc of this kind when used in one's own studio as a feature that does not tend to reduce the premium to be paid.

That is the case against the arc. On the other hand, it is adaptable to most voltages, does not require the safeguarding in conveyance that glass bulbs do, and replacement of carbons, although far more frequent than of glass bulbs, is much less costly for each occasion of replacement. The arc has the reputation, too, of being very much more actinic, power for power, than other kinds of lamps. How far that is true with the panchromatic emulsions rated so highly for gas-filled lamps, I am not able to say.

Gas-filled bulbs, on the other hand, especially those with matt glass, produce more diffused lighting than the arc, need no attention while burning, and their reputed necessity to be run on a stipulated voltage is not such a hard-drawn point as is generally supposed. Here, in London, where voltages range from 100 to 250, through half a dozen supposed graduations, I have found it quite satisfactory to use lamps of nominally 220 volts for all circuits from 200 upwards, while a couple of spare 105-volt bulbs for the few places still running on 100 or 105 volts are retained for that emergency. Certainly I think it wise to have some of the higher power bulbs, say 230 watt, for circuits around that figure, but we certainly do not find it necessary to worry if the correct figure is not discoverable before setting out. If the voltage is higher than that of the lamps, doubtless it shortens their lives somewhat, though my experience tells me it cannot do so unduly, while if the lamps are above the voltage when we get there, a little extra exposure (or the wonderful latitude of modern plates) sees to that! A light and roomy fibre suitcase takes the reflectors, and the bulbs go inside them, with a little corrugated paper for extra safety.

The larger kinds of gas-filled bulbs, those of 1,000 and 1,500 watts, are not suited to portable purposes, because their filaments are arranged for vertical suspension, and their clear glass calls for the use of diffusers practically always. There is one British make of opal-type lamp, that of Siemens, which can be had in 750 watts, but in other makes they do not go over 300 watts. I do not recommend at all the white-sprayed bulbs, because the coating too rapidly becomes dim and unsuited to photography. Mercury-vapour lamps alone are hardly suited to commercial work, on account of their colour limitations (and their fragility prohibits any frequent use away from the studio), but judiciously mixed with half-watts, they should form the ideal illumination for getting good colour values, since their tendency towards blue would be counteracted by the over-sensitiveness of the panchromatic emulsion to the red content of half-watt lighting. In the studio, whatever the incidental details of light sources, they should be arranged with as great a degree of freedom of movement as possible. Certainly a greater degree of flexibility in that respect is desirable than in the case of a portrait studio, where the sitters are not only posed usually either at one end or the other of the apartment, but are themselves of much the same sort of contour. At any rate, if one person does happen to approximate in complexion and shape to a football, and another to a transparent test-tube, it is not the business of the portrait man to arrange his lighting especially to emphasize the leathery rotundity of the one or the insipid slimness of the other! I am not suggesting here that his problem is any easier! It is merely that his tendency is to subdue such variations from type, and that is not achieved by violent departures from established lighting arrangements, such as the commercial operator finds constant use for. To allow this freedom, it is better to have several plug sockets about the room than to rely on overlong flexes which lie in a tangle about the floor. This is better electrically, too, as has been mentioned.

Cameras for the Studio.

The camera and lens equipment of the studio must depend very much upon the type of work to be handled. For many commercial subjects, principally those consisting of

mechanical subjects, and usual angles of still life and "action" illustrations of a pair of hands performing processes, the studio type of camera has severe limitations as regards the "movements" which are so invaluable in these sorts of work.

On the other hand, its larger size and long extension go a long way to compensate for lack of these, especially if a slide is fitted with an "end-carrier," as illustrated in Fig 14. This carries a plate above the normal position, and so acts in lieu of (or as extension of) the falling-front movement. The great disadvantage of a big camera in the studio is its huge bulk when making close-ups of small subjects. It is then in the way of the operator who wants to move around quickly, making adjustments to his subject and lamps, and may often cut much light off the subject just where it is most needed.

On the other hand, a light field camera, mounted on an ordinary tripod, is the last word in inefficiency and inconvenience. It is really the tripod that is in fault, for it is impossible with it to make the least adjustment up or down, or to or fro, without upsetting its arrangement in every other direction. The tripod is quite unsuitable for most work in the studio, and for those purposes in which it can be conveniently used it is far from being the best camera stand. A field camera of fairly large size, say, a whole-plate or 10×8 camera, on a light studio stand possessing a good range of both height and tilt, would be the best all-round combination for most commercial work in the studio. A lens of 11 in. focal length is the best all-round for use on half-plates, and for other sizes *pro rata*. One should not be satisfied, however, with only one lens, for there are many occasions on which one needs a shorter or a longer focal length, or greater speed. In this connection I must confess to being rather prejudiced against using the combinations of convertible lenses, in the studio at any rate. A long-focus rapid-rectilinear, though, can often be purchased quite cheaply, and, if used on a plate rather smaller than the size it is nominally intended for, will usually give satisfactory results. As regards choice of the shorter focal lengths, in the case of which the margins of the "field" are likely to be of importance, as they are when using "movements," much more discrimination needs to be used. The remarks on page

26, regarding wide-angle lenses, may usefully be noted on this point.

Walls as Backgrounds.

The furnishing of the studio must also depend on what it is to be used for. Excepting for the lamps and the camera, the emptier the studio is the better. The walls themselves can be used as plain backgrounds by distemperring them white and black in parts, or covering them with any scheme or ornamentation that may be required from time to time. Other grounds can be on flat screens mounted on castors so as to lie reasonably flat against one of the walls when not required. It may well be remembered that intermediate shades between white and black are always and easily obtainable by varying the amount of light allowed to fall on them, and the distance they are behind the subject. A spotlight, or other concentrated lamp, can often be used to lighten a background, all over or locally, or to darken it by localizing the brightest light upon the subject. With any subject which is the least bit shiny in character, it must never be forgotten how the depth of the background will influence appearance of the object itself, as explained more fully in the chapter headed "Reflections," page 166 and onward.

A Vertical Camera-bracket.

Some means of making the camera point vertically to the floor is very often a necessity in the commercial studio. There is no apparatus made in this country for this particular purpose, excepting that some of the portable stands of the "home portrait" type will allow the top to tilt as far as the vertical. The use of this is limited, of course, to comparatively small subjects that will lie between the legs of the stand and that are not so broad that they extend in width beyond the central pillar when the lens is over their middle. It is when one has to deal with a lay-out of books or show-cards, or with subjects of fairly extensive area, such as rugs and eiderdowns, that are not amenable to hanging up, and many groups of small objects, that one feels the need of something better. It is not only the spread of the objects themselves, but the need for raising the camera well up over them, as well as for getting an even flood of light over the

subject, that make some special contrivance practically essential. Fig. 41 shows one method of achieving the



FIG. 41 A BRACKET PROJECTING FROM THE WALL THAT CARRIES THE CAMERA VERTICALLY GIVES PLENTY OF CLEAR SPACE FOR MANIPULATING LAMPS AND OBJECTS

desired end. The bracket shown is constructed of two flat boards, connected with a pair of tapered frames made of iron tube. In this particular installation, since it is not in constant use, the board at the wall end is hinged to it at the top, and when the camera is removed from the front, the

whole erection swings upwards and collapses in more or less flat form against the ceiling, where a stout hook holds it till

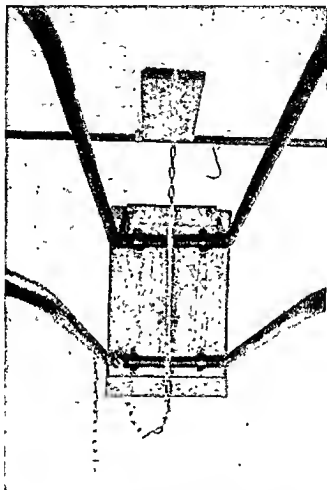


FIG. 42. A HOOK BEHIND THE CAMERA-BOARD CATCHES IN A STOUT CHAIN HANGING FROM THE CEILING AND REGULATES THE HEIGHT OF THE CAMERA

it is next required (Fig. 43). The strong dog-chain hanging from the ceiling engages in a big hook at the back of the camera board (see Fig. 42), and forms as convenient and certainly as safe a means of raising and lowering the camera,

produce. On the other hand, when the facts are boiled down, it will be realized that a great variety of lenses is not needed, as a rule. For instance, it has been impressed quite recently that fashion photographs produced by the methods of the portrait photographer do not compete favourably in some clients' minds with drawings, simply because the rapidity and curvature of the portrait lens fail to record sufficient of the texture and detail of garments. Therefore, the use of an anastigmat of not too large aperture is indicated. On the other hand, the lens must not be of short focal length, if distortion is to be avoided. For the diametrically opposite work of small still objects, short-focus lenses are equally objectionable, for in such close-up work the adverse influence of violent perspective is even more noticeable, and still smaller apertures are the rule. Therefore for both these branches of work a long-focus lens of moderate aperture will be equally suitable. Certainly for most work on half-plates the lens should not be less than 11 in. focus and for fashion work may advantageously be even longer. The loss of exposure entailed by using the smaller aperture to obtain depth of sharp definition should be made up by the use of lamps of high power, while the loss in relief occasioned by the same cause, as between figure and its background and surroundings, can be overcome by increasing the actual distance. That indicates, for full-length "fashions," that everything is in favour of a spacious studio with large backgrounds and plenty of intense illumination.

Furs are perhaps the most difficult kind of garments, from a technical point of view. They usually photograph much darker than they should, and often show in the negative as very disappointing, almost clear-glass, patches. Furs require not only that the illumination should be much more powerful than for almost any other material, but that plenty of it should be projected on to the garments rather from behind and directly from the side, in addition to the normal front light. That again indicates plenty of space around the figures to be photographed.

There is a good deal to be said in favour of using an old-fashioned bead and figure rest to steady the model who is displaying fashions, especially when the latter are furs, with their contrary combination of need for good texture (i.e.

and of securing it at any given point, as any more mechanically ingenious method that I have used previously. This arrangement allows the camera to hang vertically with the lens projecting over 7 ft. from the nearest wall, so that it is practicable to photograph a lay-out which is as much as 14 ft. wide, by arranging the latter on the floor. In the case of such an exceptionally wide spread, the difficulty of

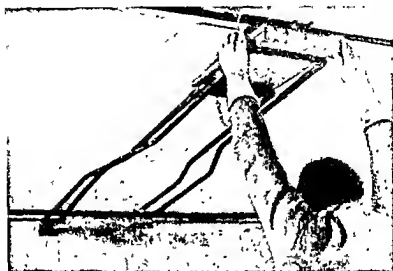


FIG. 43 THE WHOLE BRACKET IS HOOKED UP CLOSE TO THE CEILING WHEN NOT IN USE

examining the focusing screen without disturbing the subject is overcome by just arranging only part of the details, and by marking the boundaries of floor-space which will be included on the plate, and within which the remainder of the objects can be arranged when the camera has been adjusted ready for exposure. Using a vertical camera usually means standing on a chair or steps to get a view of the focusing-screen, but most of the strain can generally be avoided by holding a mirror over the camera, and examining the reflection in it of the image on the ground-glass.

Lenses in the Studio.

The kind of lenses that should be selected for work in the studio depends very largely on the kind of work they are to

arranged immediately behind them or in any other position that is found desirable. A profusion of rolls of paper of various plain and ornamental character is useful in the object studio, and so is at least one adjustable mirror, as made for the portrait studio. Even a spotlight is very far from being out of place for adding brilliance and relief for emphasizing special features, or for introducing definite shadows into a composition. A collection of pieces of material for background purposes, some stiff cards, white for small reflectors, and black for preventing reflections, are essential, and so is a supply of drawing pins, tacks, string, wire, screws, and nails, and a few tools such as hammer, pliers, screwdriver, and scissors.

One very useful fitment for a studio of any kind, whether for the very simplest work or the most elaborate, is a pigeon-hole, light-trapped on either side, whereby freshly-loaded slides can be passed in from the dark-room, and passed back again after exposure for immediate development, without anyone having to waste time in unnecessary walking, and without interrupting the progress of work in either department.

perfect stillness) with need for long exposure (risk of movement). Of ornamental accessories for use in making fashion pictures, it is useless to write in a textbook such as this for the two reasons that variety and originality are the essence of good fashion photography, and that any definite features of one man's work I might describe would become hackneyed, and finally out of date and useless long before this book goes out of print.

Furniture and Fittings.

Furniture for photography of models, whether to illustrate fashions or action scenes, can usually be hired from a firm that supplies pieces or suites on hire to theatres. Other incidental items, such as pictures and ornaments, for composing a picture can be hired or sometimes borrowed. It is not much use buying such items to keep in stock, for they can be used a second time sometimes, but hardly ever a third time.

On the other hand, some photographers find it practicable to equip one corner of their studio as a bathroom, another as a kitchen, while at the far end they can quickly stage a bedroom scene or a picnic with equal ease. The latter naturally would be made with a plain background for insertion into a real outdoor view subsequently. It is quite easy and inexpensive to change the character of a room, or even one corner of it, quite completely by the aid of modern wall-papers and incidental decorations, while the studio that goes in for such work will certainly require to have a selection of ready-prepared walls kept in the flat. Such walls are easily made of plywood on light frames. Beaver board and the like is perhaps more easily decorated than ply, but it is astonishingly heavy when built up on both sides of even a smallish framework, and is therefore unwieldy for rapid erection and dismantling when a change of scene is quickly needed.

Simple Objects Need Simple Equipment.

The photography of simple objects naturally does not call for either a great deal of space or of elaborate accessories. All the same, it is a decided advantage not to be cramped, and to have reasonable space all round the bench on which the objects are placed, so that, if need be, lamps can be

arranged immediately behind them or in any other position that is found desirable. A profusion of rolls of paper of various plain and ornamental character is useful in the object studio, and so is at least one adjustable mirror, as made for the portrait studio. Even a spotlight is very far from being out of place for adding brilliance and relief, for emphasizing special features, or for introducing definite shadows into a composition. A collection of pieces of material for background purposes, some stiff cards, white for small reflectors, and black for preventing reflections, are essential, and so is a supply of drawing pins, tacks, string, wire, screws, and nails, and a few tools such as hammer, pliers, screwdriver, and scissors.

One very useful fitment for a studio of any kind, whether for the very simplest work or the most elaborate, is a pigeon-hole, light-trapped on either side, whereby freshly-loaded slides can be passed in from the dark-room, and passed back again after exposure for immediate development, without anyone having to waste time in unnecessary walking, and without interrupting the progress of work in either department.

perfect stillness) with need for long exposure (risk of movement). Of ornamental accessories for use in making fashion pictures, it is useless to write in a textbook such as this for the two reasons that variety and originality are the essence of good fashion photography, and that any definite features of one man's work I might describe would become hackneyed, and finally out of date and useless long before this book goes out of print.

Furniture and Fittings.

Furniture for photography of models, whether to illustrate fashions or action scenes, can usually be hired from a firm that supplies pieces or suites on hire to theatres. Other incidental items, such as pictures and ornaments, for composing a picture can be hired or sometimes borrowed. It is not much use buying such items to keep in stock, for they can be used a second time sometimes, but hardly over a third time.

On the other hand, some photographers find it practicable to equip one corner of their studio as a bathroom, another as a kitchen, while at the far end they can quickly stage a bedroom scene or a picnic with equal ease. The latter naturally would be made with a plain background for insertion into a real outdoor view subsequently. It is quite easy and inexpensive to change the character of a room, or even one corner of it, quite completely by the aid of modern wall-papers and incidental decorations, while the studio that goes in for such work will certainly require to have a selection of ready-prepared walls kept in the flat. Such walls are easily made of plywood on light frames. Beaver board and the like is perhaps more easily decorated than ply, but it is astonishingly heavy when built up on both sides of even a smallish framework, and is therefore unwieldy for rapid erection and dismantling when a change of scene is quickly needed.

Simple Objects Need Simple Equipment.

The photography of simple objects naturally does not call for either a great deal of space or of elaborate accessories. All the same, it is a decided advantage not to be cramped, and to have reasonable space all round the bench on which the objects are placed, so that, if need be, lamps can be

arranged immediately behind them or in any other position that is found desirable. A profusion of rolls of paper of various plain and ornamental character is useful in the object studio, and so is at least one adjustable mirror, as made for the portrait studio. Even a spotlight is very far from being out of place for adding brilliance and relief, for emphasizing special features, or for introducing definite shadows into a composition. A collection of pieces of material for background purposes, some stiff cards, white for small reflectors, and black for preventing reflections, are essential, and so is a supply of drawing pins, tacks, string, wire, screws, and nails, and a few tools such as hammer, pliers, screwdriver, and scissors.

One very useful fitment for a studio of any kind, whether for the very simplest work or the most elaborate, is a pigeon-hole, light-trapped on either side, whereby freshly-loaded slides can be passed in from the dark-room, and passed back again after exposure for immediate development, without anyone having to waste time in unnecessary walking, and without interrupting the progress of work in either department.

CHAPTER VI

MATERIALS

I do not propose in these pages to indicate any preference between films and plates. Therefore, whenever the word "plate" is used it may be used as meaning "plate or film," since there is so far no omnibus word for the purpose, unless it be "emulsion," which is the coating for which glass or celluloid respectively acts as a support.

Why Panchromatics.

The commercial photographer to-day finds panchromatic plates indispensable. It must not be supposed that their advantages lie only in the photographing of coloured objects. In large towns they go a long way towards securing reasonable negatives of exterior subjects in muggy weather. For night work, either street-scenes, shop-windows, or interiors by artificial light, the panchromatic will shorten exposures marvellously. Subjects with reflecting surfaces, such as french polish, water, glazed showcases, and many others, tend to result in white glare. When using a panchromatic plate, not only is the glare much reduced, but the detail underneath the shiny surface is brought out, more especially if a filter be used. For view-work, for coloured objects in the studio, for copying paintings or posters, for photography of "fashions" or furniture, panchromatics are essential.

Therefore, whatever plates a photographer favours for the bulk of his work, he must have a supply of panchromatics. If he does any quantity of copying work, he will almost certainly need some process plates, if only for the faint faded originals (see page 223).

Choice of Papers.

Most commercial work is produced on glossy bromide paper, for its advantage is retaining all detail for reproduction as well as for its general appearance of brilliance so attractive to the average commercial mind. When making prints for the personal use of a client, or for exhibition in

frames on his office wall, it is often better to use something different. There are many papers in quite bewildering variety of surface, colour, and contrast grade of the chlorobromide as well as bromide emulsions, which actually reproduce the whole scale of detail and gradation while giving a "superior" appearance to the photographs. It is a mistake, to my mind, to issue a dead-matt-surfaced print to a client who has already had a glossy print one of the same subject, unless it is quite a big enlargement, or the subject is one that is particularly suited by the softened effect. A semi-glossy print usually is more appreciated.

Chemicals are Cheap.

Chemicals should be obtained from reputable sources. It is no economy, for instance, to use washing soda in place of carbonate. The cost of chemicals on average runs of work produced at the P.P.A. scale of charges is little more than 1 per cent of the price of the photographs. The odd penny or two gained by using cheap materials is lost over and over again in waste of time and quality in printing from the irregular negatives.

Tins for Storage.

Tins make very good containers for almost all materials, plates, papers, and chemicals. For the former, and especially for varieties which are not in regular use, there is no better container than one of the double-cased tin trunks which are sold to keep uniforms or documents safe when travelling in hot climates. When closed, these boxes are water- and air-tight, and the double case makes for equality of temperature. There is nothing worse for sensitive material than to be stored in its card or paper wrapping on the dark-room shelf, and this applies most of all to panchromatic material which is desired to keep its good condition for some months. Even the bromide paper in regular use is best kept, at least all night and during week-ends, in a tin box, if consistently brilliant prints are to be sent out without worry from damp paper. At the least, when makers go to the trouble and expense of wrapping materials in waxed paper, it is only one step farther to insist that varieties which are not rapidly used up should be re-wrapped in it.

Preventing Stale Sodas.

Tins are also quite suitable for storing such dry chemicals as come in paper or card, unless the room where they are kept is too damp in which to keep chemicals at all. In the case of sodas, it is certainly not a good thing to let them remain long in the paper bags in which many people prefer to buy them, in the praiseworthy endeavour to save the trouble and expense connected with returning and booking of "empties." In my own workroom there are two pairs of tins, one large and one smaller pair. One large tin and one small are marked with a bold black S, and the other two with a C, for sulphite and carbonate respectively. The two large tins stand side by side on a shelf (no, *not* on the floor!) and the corresponding small tin stands over each on the shelf above. When the soda in the bigger tin begins to get low, and a fresh lot is ordered in, the remains of the old is poured into the smaller tin before filling the larger one with the new, and so is used up first. Thus, there is never any old congealed soda clogging up the bottom of a container, and so becoming useless.

Odd Packets of Paper.

Similarly, I have a system for keeping down to a minimum the oddments of paper of less usual sizes and surfaces that often are allowed to become unusable. The first part of this consists in the way such packets are opened and handled. The second part governs what is done with the last odd sheet or two. When packets (as distinguished from the usual run of gross boxes) are opened, the black inner envelope is re-inserted in the outer cover so that both flaps face the same way. This allows of extracting sheets as required without having to entirely close the packet each time one needs to examine a print by white light (see Fig. 41). On the other hand, there is never any need at any subsequent time to withdraw entirely the inner from the outer envelope. The latter practice is so very bad, because if one unwraps more than one packet of a size before properly repacking the previous one (as, for instance, when trying what paper will best suit a special subject), it is by no means unknown for some contrasty matt paper to spring out at late from

a "soft glossy" envelope, or worse still, for some black packets of unknown varieties to be discovered lying "spare" around the printing-room.

When a packet of paper, of an unusual size or kind, is nearly used up, and there remains only an odd sheet, or in the case of large sizes, some torn-up pieces, these are at



FIG. 44. PACKETS ARRANGED WITH INNER AND OUTER FLAPS THE SAME WAY ALLOW OF CONVENIENCE AND OF SAFETY WHILE PRINTING

once cut down in a trimmer to a more usable size, say, half-plate, and are thrust down to the end of the envelope, which is then folded and placed underneath the pile of stock boxes. They are then in sight when occasion arises for some rough prints, such as proofs, tests of retouching, or prints for "bleach-outs" and the like. Not only do these odd pieces get used up before they go bad, but this system prevents new stock from being used when only rough proofs are required.

Away from Fumes.

Stock packets of sensitive material should not be stored in the darkroom, excepting opened ones actually in use, because of the prevailing damp atmosphere which favours the rapid deterioration of all photographic materials. Because of their active fumes, it is inadvisable to keep such chemicals as soda sulphide and hydrochloric acid either in the darkroom or in the room in which stock packets are stored.

A Quick "Material Report."

The following shows a rather good method of checking very quickly the stock of plates and paper in hand, at the same time without chance of missing any item, and it affords a ready guide to items that require ordering. It consists in ruling a few columns, one for the *kinds* and one column for each size generally used. The form should not be crowded and on it the quantities in stock are written in any order that may be most convenient. When all the squares are filled, it is obviously certain that all the kinds and sizes usually kept have been checked. By writing the figures fairly small at one side of each square, one can add, in bigger figures or in red ink, the amounts to order, or can cross out those of which there are sufficient. The order can then be written out from this list without any tax on the memory, and without any fear that an item has been omitted.

A similar method can be used with advantage for checking the stocks of chemicals, mounts, or any other items that require occasional replenishing.

	1	2	3	4	12	12
PLATES—						
Panclino . . .						
Studio . . .						
Process . . .						
Process paper .						
PAPERS—						
Normal brands .						
Contrasty . . .						
Soft . . .						

CHAPTER VII

DARK-ROOM METHODS

IN the commercial conditions ruling to-day speedy work is one of the principal considerations. The public have become familiar with the rapid deliveries of their snapshots, to say nothing of the marvels of press work, in the course of which an event is often illustrated in the evening papers within an almost incredibly short time after it has actually occurred. Therefore the commercial photographer rarely gets thanked for producing his results the same day. More often it is a condition of the order.

The photographer who can arrange the semi-automatic parts of his work to swift and practically fool-proof processes can therefore leave them safely to less skilled hands, and can concentrate his energies upon the parts of the work calling for the higher artistic, technical, and business qualifications. That means, of course, standardization in the foregoing details. It is a mistake, in my opinion, to leave the calculation of formulae and choice of the necessary weights to a youth. What often happens is that he cannot for the life of him keep to the custom of reading the formula every time he makes up solutions. Nor can he, as a rule, calculate the amounts for a gallon of concentrated developer when he is given the details for a pint. Moreover, it very often happens that an assistant, trusting 'as usual to his memory, will make a mistake in the amount of an ingredient. Next time he will repeat the mistake, because the natural habit is to do what he did last time. The consequence is that a vague something seems to be going wrong in the way of a run of work not up to standard, of extra trouble in the printing-room, struggling to get good prints from unfamiliar sorts of negatives, perhaps even the prints themselves being of poor colour and altogether unsatisfactory. There is no end, in fact, to the annoyance, and even loss of business, that can occur from a comparatively innocent error in compounding developer, and the waste of time that can occur in tracing the effects of the trouble back to their original cause.

Simplified "Dispensing" of Formulae.

Therefore, it is best to prevent any possible chance of such an error by reducing the dispensing of formulae to a task that

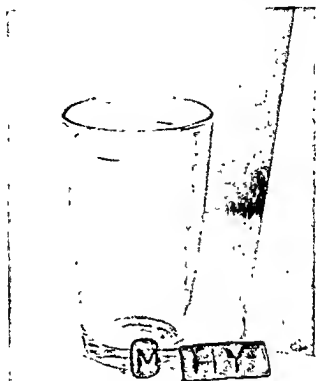


FIG. 45 THE "WEIGHTS AND MEASURES" FOR COMPOUNDING STOCK CONCENTRATED DEVELOPER

The shadow alongside, and its reflection down the glass, exemplifies a point in Chapter XII

needs little intelligence and no arithmetic. There is a good old-fashioned way of achieving this by the use of weights cut out of lead sheet. For each ingredient there is a weight which means no more to the assistant than the name of the chemical it is to weigh and which can easily be impressed

upon the actual weight. Containers for solutions are made or selected to hold the required quantity when filled to the top. All that the lad has to do is to use the weights he is

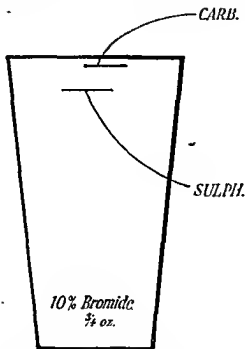


FIG. 46. DIAGRAM REMINDER, POSTED UP IN THE WORKROOM
Showing use of the "weights and measures" (Fig. 45)

given and to dissolve in enough water to fill the container. In my own practice I have gone one step farther as regards the sodas, for which a glass measure is used in place of weights. I found that it was not only quicker but actually more accurate to use a big glass on which are scratched (by means of a wet file) two marks. The top line is for carbonate, while sulphite is filled to the lower line.

Thus, for the great bulk of my work the developing formula is the diagram shown in Fig. 46, and the weights and measures required to be understood are those in the preceding illustration (Fig. 45). These make up one container of concentrated developer. This is used in the proportions of "half and half" for bromide papers, and "one to

four" for plates. For line negatives or for gaslight paper, or for any other purpose of special contrast, it is used "neat." That is quite sufficient vocabulary, I have found, for the average embryo mind. If and when the latter shows the ability of grasping more complicated matters, there are plenty of better and more profitable outlets for mental energy in our business than grappling with formulæ and their vagaries.

There is one idea about using scales that must be watched for, and rooted out once and for all, when a lad is first allowed to weigh chemicals. He will almost inevitably do what he thinks the grocer does, namely, pile on the stuff till the scale goes down. He should be supplied with plenty of clean paper, all cut to a standard size, and be taught to use a piece *on each pan*, and to weigh the *level* amount. Once he gets the word *balance* to replace the word *scales*, he will have the right idea.

Similarly, the fixing baths can be simplified from the start by using a mug that scoops up a pound, and another, or a special lead weight, for the metabisulphite. Any other formula can be worked in the same fashion. So much so that, far from attributing any superiority in results to the possession of a particular formula, I am only able to state the actual developing formula I use by reference to a book which has certainly not been looked at for several years! That can be accepted as a measure of the advantages of the method described above.

Correct Temperature in Tank or Dish.

The use of developing and fixing tanks is a subject that is now very widely understood, and for dealing with batches of exposures there is undoubtedly no better method for producing negatives of regular easy printing quality. A man who has to get small numbers of photographs, and sometimes even single ones, produced in a minimum of time cannot always allow the necessary period for tank development, and he may not always have enough work of one kind to warrant filling his tank. Therefore, dish development is at least sometimes unavoidable, and it is here that extra trouble is called for to secure standards of time and temperature. A lot of time can be wasted in warming up a dish of developer

too far and waiting for it to cool again. A very good plan, during cold weather, of getting the developer right for plates, is to keep a large kettle continually over a glimmer of gas. Some of this hot water is poured into a porcelain dish, and as soon as the latter is warmed through, which will be in the few seconds required for pouring out the "juice" and diluting the same with tap water, the hot water is poured away, and the developer poured in. It takes but a very few further seconds, while putting in the thermometer and examining it, for the heat of the dish to be assimilated by the rocked solution. In extra cold weather a very little of the warm water can take the place of some of the tap water, and as summer approaches less time is taken for the preliminary warming of the dish. This all sounds very rule of thumb, I must admit, but in workrooms that are kept reasonably warm it is found surprisingly practical a method for the average worker.

It is an infinitely sounder plan than the one, apparently more scientific, of holding the dish of developer over a source of heat till the thermometer registers the height desired. What usually happens, with the latter method, is that the outside bottom of the dish is very much hotter than the thermometer suggests, but the extra heat is imparted to the solution during the course of using it in the dark.

Fixing Baths.

The most rapid fixing baths are those made up in the proportions of a pound to the quart, which, if there must be a formula to remember, is not one that exerts a great mental strain. It should always be remembered, however, and impressed upon others fairly frequently, that a fixing bath does not retain that strength for long. Nor is such a strong bath advisable for many purposes beyond rapid fixing of negatives. The practice of adding fresh crystals to a worked-out fixing bath is actually wasteful, as well as being utterly wrong technically. In the case of negatives, any attempt to intensify one fixed in such a "freshened" bath is likely to prove disastrous. In the case of prints, there are at least two troubles that will arise. Prints for sulphide toning are doomed to degradation, or, in other words, brownish whites, if they are fixed in a hypo bath that has been partly worked

CHAPTER VIII

THE PRINTING-ROOM

SINCE those early years when my own life consisted mainly of solitary confinement in the sort of cold, damp cells that were then only too truly called "*dark-rooms*," I have been at great pains to ensure that neither I myself nor anyone in my employ should continue to endure such experiences. Panchromatic material has to be developed in total darkness, but that is all. Other rapid plates can be handled in much more comfortable and ample light than is often provided or realized (given proper precautions), but it is in the printing-room that most time is spent, and here there is no excuse whatever for dimness.

Why Dark-room ?

Even if comfort is not considered important, correct printing is, and so is the absence of accident in the way of knocking against things in the darkness. The illumination of the room for printing on bromide paper, and for developing process plates, too, can be so good that after a very short period one can work in any part of the room with no sense of discomfort or of being in the dark at all, and can judge the depth of prints as they lie in the dish without eye-strain.

For gaslight and chloro-bromide papers the light can be even more brilliant still, so long as it is yellow.

The illumination in my own printing-room consists of only one "pearl" gas-filled lamp, but all the walls are light grey, and instead of screening the rays of the lamp off, by putting it inside a metal box, the lamp merely hangs in a large shallow frame fixed high against one wall covered in front with a single sheet of yellow fabric, reinforced with a patch immediately in front of the lamp itself of a deeper yellow. In this way the direct rays in the centre are rendered safe for illuminating the developing bench, which is several feet away and below, while the weaker marginal rays, instead of being wasted, are rendered quite safe by the paler yellow to give a general illumination all over the room. There is, of

course, an additional "white light" by which to examine prints and do other work in the intervals between actual printing.

The "safety" of this lamp has never been tested by the method of holding a piece of bromide paper near to it, because, in practice, no paper ever does get used near enough to it to get fogged. In the exceptional cases when paper is liable to receive undue exposure to the yellow light, as, for instance, in cutting up big rolls, it is quite easy to obscure part of the lamp temporarily.

Regulating Temperature.

In cold weather the developing dish is kept up to temperature by use of a copper platform, some little way below which is an electric hot-plate. A switch fixed quite close permits of turning the heat on and off as the thermometer falls and rises within the boldly-marked margins allowed. As the hot-plate holds, as it were, a stock of heat, it acts, with the air space between itself and the dish, as a much smoother-acting means of regulating temperature than more direct methods, and needs less frequent using of the switch. As the hot-plate gives no light it does not need screening, and its warmth helps to make the room comfortable to work in.

Spilled Water and Other Rubbish.

The floor line is carried slightly upwards on the walls, and is cemented to the floor at the joins with waterproof roofing paste. Thus, when water happens to get spilled, as it is sure to be sometimes in the best regulated printing-room, there is no fear of its soaking through the floor to the ceiling below before it can be mopped up.

There should be an ample rubbish bin in each room in any commercial photographic establishment. The quantities of waste paper that accumulate would astound anyone not familiar with what actually seems to happen! Fortunately, empty hypo tubs seem to be specially designed to fill this very definite necessity.

Towels seem to present a problem in some printing-rooms I have known. There seems no real reason why they should, especially in large towns where a commercial towel service exists. For a shilling a week, or less, one of these firms will

supply a weekly change of several clean towels and dusters, the provision of which will prevent far more than a shilling's-worth of fingermarks and other trouble, to say nothing of the time that is often spent by assistants in vain attempts to dry their hands on a rag fairly soaking with wet chemicals.

Printing Apparatus.

Printing and enlarging apparatus, though not previously mentioned, is, of course, the most important feature of the printing-room, and its choice should be the subject of careful consideration. It may be fairly presumed that no one to-day uses anything but a printing-box for his contact work, although, to be sure, when I was writing the first edition of this book I became acquainted with one worker who was still using a frame, in spite of the fact that printing-boxes were in use thirty years ago. That was even before electricity had more than begun to supplant daylight and gas in photographic practice. The roughest home-made printing-box, provided it has a decent sheet of glass at the top, with some means of pressing the paper in contact with the negative, is far less time-wasting than the finest printing-frame ever made. There are many patterns of first-rate printing-boxes listed by the various makers. For use with bromide papers, little attention need be given to the amount of the light provided, since a 40-watt lamp is ample for most contact bromide printing. The features that should receive most attention are first the evenness of the illumination, which should not either be cut off, or have some added light from the reflecting sides, at the margins of the largest negative it is built for. Equal in importance are the perfection of the contact board and the build of the pressure action which should retain its perfect activities throughout a very long life. The third important feature that should be looked for in choosing a printing-box is the provision of some easy means of shading parts of the negative with tissues when required. Many printing-boxes do not possess this latter, and I have known a box that cost as much as eight guineas to need replacement of metal parts with stouter, specially made ones, together with longer screws to hold them to the wood, before it had been in use a couple of months.

For printing on gaslight or chloro-bromide papers, more

course, an additional "white light" by which to examine prints and do other work in the intervals between actual printing.

The "safety" of this lamp has never been tested by the method of holding a piece of bromide paper near to it, because, in practice, no paper ever does get used near enough to it to get fogged. In the exceptional cases when paper is liable to receive undue exposure to the yellow light, as, for instance, in cutting up big rolls, it is quite easy to obscure part of the lamp temporarily.

Regulating Temperature.

In cold weather the developing dish is kept up to temperature by use of a copper platform, some little way below which is an electric hot-plate. A switch fixed quite close permits of turning the heat on and off as the thermometer falls and rises within the boldly-marked margins allowed. As the hot-plate holds, as it were, a stock of heat, it acts, with the air space between itself and the dish, as a much smoother-acting means of regulating temperature than more direct methods, and needs less frequent using of the switch. As the hot-plate gives no light it does not need screening, and its warmth helps to make the room comfortable to work in.

Spilled Water and Other Rubbish.

The floor lino is carried slightly upwards on the walls, and is cemented to the floor at the joins with waterproof roofing paste. Thus, when water happens to get spilled, as it is sure to be sometimes in the best regulated printing-room, there is no fear of its soaking through the floor to the ceiling below before it can be mopped up.

There should be an ample rubbish bin in each room in any commercial photographic establishment. The quantities of waste paper that accumulate would astound anyone not familiar with what actually seems to happen! Fortunately, empty hypo tubs seem to be specially designed to fill this very definite necessity.

Towels seem to present a problem in some printing-rooms I have known. There seems no real reason why they should, especially in large towns where a commercial towel service exists. For a shilling a week, or less, one of these firms will

supply a weekly change of several clean towels and dusters, the provision of which will prevent far more than a shilling's-worth of fingermarks and other trouble, to say nothing of the time that is often spent by assistants in vain attempts to dry their hands on a rag fairly soaking with wet chemicals.

Printing Apparatus.

Printing and enlarging apparatus, though not previously mentioned, is, of course, the most important feature of the printing-room, and its choice should be the subject of careful consideration. It may be fairly presumed that no one to-day uses anything but a printing-box for his contact work, although, to be sure, when I was writing the first edition of this book I became acquainted with one worker who was still using a frame, in spite of the fact that printing-boxes were in use thirty years ago. That was even before electricity had more than begun to supplant daylight and gas in photographic practice. The roughest home-made printing-box, provided it has a decent sheet of glass at the top, with some means of pressing the paper in contact with the negative, is far less time-wasting than the finest printing-frame ever made. There are many patterns of first-rate printing-boxes listed by the various makers. For use with bromide papers, little attention need be given to the amount of the light provided, since a 40-watt lamp is ample for most contact bromide printing. The features that should receive most attention are first the evenness of the illumination, which should not either be cut off, or have some added light from the reflecting sides, at the margins of the largest negative it is built for. Equal in importance are the perfection of the contact board and the build of the pressure action which should retain its perfect activities throughout a very long life. The third important feature that should be looked for in choosing a printing-box is the provision of some easy means of shading parts of the negative with tissues when required. Many printing-boxes do not possess this latter, and I have known a box that cost as much as eight guineas to need replacement of metal parts with stouter, specially made ones, together with longer screws to hold them to the wood, before it had been in use a couple of months.

For printing on gaslight or chloro-bromide papers, more

intense illumination than for bromide papers is usually needed, and the even quality of the illumination over the negative area is, if possible, of even greater importance. In either case the pressure action should be swift and easily worked without having to acquire a special knack, in other words, the box should have a positive powerful pressure action with no risk to glass negatives. The box, moreover, should be supported at a convenient height from the floor (the glass top at 36 in. is a good average working level), and it is a great advantage to have the table or other support of a firm build and screwed down to the floor. The complete rigidity so obtained is a great help when a rush of work is being contended with.

Shading a "Sine Qua Non."

Access to the glass shading-shelf should be, if possible, arranged by a sht or door at the side or front of the box rather than by moving the negative bed. Thus it is possible to slip in extra sheets of tissue or tracing-cloth either for dimming down the light when printing from weak negatives or for local shading where required. If the glass shelf itself is made to slide in and out it greatly facilitates convenient arrangement of the shading pieces.

Waxed paper is found to be the best kind for local shading, since a sheet of ordinary tissue often is too dense, bringing the portion shaded lighter in tone, in the print, than it should be.

A plentiful supply of waxed paper is kindly supplied by certain plate-makers, and when it has served its purpose of preserving the contents of a packet from the deleterious effects of damp and fumes, it performs another excellent service for the printer. In any case it can be obtained from a chemist or from many other sources, such as wrapping-paper merchants.

Limitations to Shading of Uneven Negatives.

Just as a letterpress printer finds it necessary to use considerable "make-ready" in the form of "underlay" and "overlay" here and there, in order to get uniform pressure over what is theoretically a perfectly flat surface, so can the photographer, with bits of wax-paper, obtain far

more satisfactory results by judicious "shading" in the vast majority of commercial subjects.

If one portion of a negative, however, being more or less under-exposed, is very much thinner all over than other parts, there is always the danger in shading such a thin portion sufficiently for it to print normally with the remainder that the deepest shadows in the shaded portion of the picture will be noticeably lighter in tone than similar shadows elsewhere, which is absurd. Therefore, one is bound to remember that shading can be employed to assist and improve unduly heavy portions of a subject but can rarely be used so as entirely to cure the trouble. In the type of subject referred to there is frequently another and better way out.

An Alternative Method.

Instead of depending entirely on shading in printing, even if local treatment of the negative has been effected, the print can be made instead with just a slight amount of shading. If that is done the shadows will probably look still far too heavy, and may even clog up into blackness on drying. If, however, the print be held up to a lamp, and examined by the transmitted light, the lost details will all be seen to spring to life. How then to bring them out so that they will be seen by reflected light in the ordinary way? The answer is, by careful local application of a weak cyanide-ferricyanide reducer. This is often a marvellous power for good in the difficult type of subject under discussion.

Vertical versus Horizontal Enlargers.

The actual height of the ceiling will have a great influence upon the question of vertical *versus* horizontal enlargers. The Aldis-Ensign enlarger, for instance, needs a total height of 6 ft. above the easel board if it is required to use the full range up to a 3 ft. enlargement from a half-plate. Nor will it make bigger enlargements than this. Therefore it is advantageous in some cases to possess more than one enlarger, even for a small organization, in order to cope with the exceptional cases which the quicker-working vertical machine will not conveniently handle.

If there should be the necessity for enlarging from wet negatives, it may usefully be noted that the heat generated

stinted, for a shilling's worth of chemicals will do a lot of work, and it is "penny-wise" policy to use developer after its first flush of energy has abated. The proportion of an ounce of developer to the half-plate print is as little as can be depended upon for really good work. The same applies to fixing solution, for although prints may come out of it looking very fine, if it has been overworked these same prints will be looking very dingy in a few months. If they are sulphide toned the dinginess will appear right away, and cannot then be cured. In fact, a very good test of thorough fixing of prints is to rinse one of them pretty thoroughly, and then to apply to one clear edge a crystal of soda sulphide. The slightest brown tinge will indicate that the print is imperfectly fixed.

An important point is that after a certain point is reached, a bath that appears to fix quite actively is not capable of really thorough fixation. This is because the clearing of the yellow silver bromide is only the first stage of fixing. It has merely been converted to another substance which is invisible, but is also insoluble, and cannot be removed by washing. The second stage of fixing, that of converting the insoluble silver to a soluble form, is also invisible and calls for a bath not already clogged up with dissolved silver. The danger is that either form, if left in, will darken in time, but prints rarely receive the turning over in fresh solutions that, conscientiously performed, ensures the complete chemical changes taking place.

Effective Print Washing.

Washing of prints, unless they be very few or of a small size, is well performed by hand, by changing from dish to dish. It should be insisted upon that while one hand is used to change prints from one dish to another, the other hand should be actively engaged in lightly dabbing each under water in turn, so as to present a fresh supply of water, instead of merely the back of a print, to the next. The idea is to keep up a rapid but gentle movement, keeping all the prints slightly moving. Twenty minutes, or six changes, of such treatment will be found satisfactory for a good batch of prints. Eight conscientious changes will extract as much hypo as an hour of machine washing, and the latter is rarely

successful for large or thick prints. The method, often witnessed, of leaving a dishful of prints with the tap running into it, is efficient in so far as it washes thoroughly just one corner of the top print! Beyond that the prints will be found on test, after an hour, to contain almost as much hypo as at the start.

Rush Prints.

It is sometimes necessary to get prints out in a great hurry, and several methods are available. From an already dry negative the problem is one of drying off the prints only, which is a very simple matter. It means merely blotting the water off them in a towel and soaking them in methylated spirit for a few minutes, after which they are again blotted off and held over a gas-ring, but not too closely, or kept too still. If the negative be freshly made it can be printed from by the simple expedient of squeezing upon the wet surface a sheet of very thin celluloid.

Sudden drying off by heat is liable to increase the contrast of a negative in very marked manner, and although the circumstance may be advantageous to the pressman it is often otherwise in commercial work; nevertheless it may be necessary, and by far the best way is to harden first in a bath of formalin, one part in ten of water, for five or ten minutes, and to stand the negative in a warm current of air. This draught should be directed rather edgewise than broadside on to the film so that the moisture is carried away. A piece of chamois leather is better than anything else for first getting off the surface moisture.

Methylated spirit is more generally used than anything else for drying off negatives, but there are several drawbacks to its successful use. Unless a reasonable amount of hypo is washed out first, and if the subsequent heat or draught employed is a little too prolonged, a white deposit is produced in the film. This is of great density, and although it is easily removable by application of water, it only means that the drying process must be repeated all over again. Especially for negatives which are to be enlarged from, the formalin method is superior and more reliable, since even the warmth of the lantern may produce the familiar spirit deposit. There are other methods of partially drying negatives and prints,

such as immersion in a saturated solution of potass carbonate, or even of hypo, for a few moments, followed by wiping surface dry with a towel, but this device is more suited to cases where a print or negative has to be hurriedly submitted in a just sufficiently dry state for convenient handling.

If this device is used, it is obvious that the pores of the gelatine are filled with chemicals just off the crystalline state instead of plain water. If any attempt is made to wash the salts out subsequently, the chances are that the gelatine will absorb water greedily, and will then blister badly. If the print or plate is of any importance the only safe thing to do is to replace it in a little of the strong solution in which it was "dried," and allow a trickle of water gradually to dilute the former, letting it run very gently indeed, so that the exchange from saturated solution to plain water takes place very slowly indeed. After that the emulsion will dry naturally in the usual way.

Successful Glazing.

There is no doubt that glazing adds considerably to the "finish" of unmounted prints on a glossy surface paper. Apart from the actual glaze of the gelatine there is a flatness of the paper that is a distinct improvement upon the rough-dried article. Many people find considerable difficulty in getting prints satisfactorily glazed, and others find prints stick. Glass is more liable to the sticking trouble, when it occurs, than ferrotypes or celluloid sheets, since apparently it is more porous and holds the gelatine thereby. At the same time the latter both are so easily scratched that for perfectly finished work they are useless after being used a few times.

Plate-glass gives a very slightly better finish than good sheet, but the difference is only discernible for an hour or so after the prints have left the glass. The weight and cost of plate-glass are against it too. The troubles associated with sheet-glass amount to two, viz. sticking and specks. The use of a special glazing preparation, of which several makes are on the market, will usually obviate the former. The glazing solution consists mainly of oxgall solution containing a proportion of formalin which acts as a preservative to the oxgall, and to a slight degree, as a hardener to the film. If the

gelatine still shows a tendency to stick to the glass when using a glazing solution, it can easily be given the necessary extra toughness, either by a hardening component in the fixing-bath, or by a separate hardening bath. For the latter purpose there is nothing better than formalin, in a weak solution, say 5 per cent or 10 per cent in which the prints can be immersed for a few minutes. There is no need to do more than rinse the prints after this bath since formaldehyde (the essential element of the bath) is merely a gas dissolved in the water, and evaporates on drying. Most of these glazing troubles can be completely avoided by use of the modern chromium-plated sheets, either flat plates or in the form of a revolving drum. The latter being heated, hardening of prints is desirable.

Avoiding the Cause of Poor Glaze.

Some people are prone to be troubled with fleck marks, or tiny spots that seem to refuse to glaze. While larger spots of dullness undoubtedly are due to air bubbles, which can be seen immediately after glazing if the prints be looked at through the glass, these other marks do not appear often till they are practically dry. In the vast majority of cases this trouble is due to nothing more than dust. That this is true, anyone who is troubled in this way can prove for himself in a very simple way. A print which shows the fault is soaked in a dish of clean water. The print is then laid face upwards upon a glass and *rubbed hard* with a bit of rag under a stream from the tap. If it is then reglazed on a clean glass the chances are that it will come off perfectly, thus proving that there is nothing wrong with the gelatine.

It is not often realized that specks of dust will adhere to a print on drying and be unnoticed in the ordinary way. Either fluff from the drying net, or invisible dust from the air, is quite sufficient to cause this trouble, so that prints which have been dried before glazing should always be suspect, and should receive, not merely soaking, but a rub under the tap, before laying upon the glass. Even freshly-made prints can collect dust and grit to a surprising extent, in the washing water. The glazing solution itself, if not quite fresh, is liable to form a sediment likely to give trouble, and should be filtered from time to time. The alseas

themselves should have a scrub and a rinse, not in a batch, but singly as used.

Before commencing to glaze a batch of prints, a dish of clean water may be placed ready, and the prints transferred to it in the following way: they are left face upwards in the bottom of the last washing water, preferably in a deep dish, and are lifted one by one by a corner and with a swift movement, so that the weight of the water swills off any loose grit or bits of gelatine that often become detached from edges of prints during manipulations. When all have been transferred to the clean water quite a lot of loose matter can often be noticed in the last dish. If this, and the other precautions be taken, the speck trouble will very rarely show itself. If the water supply itself be suspected it is easy to filter a quantity through a bit of flannel and make a test with the filtered water. The specks seen upon the prints are not the grains of dust themselves but the much larger areas of film they prevent from properly adhering against the polished surface of the glass.

Getting "Best Possible" Prints.

The quality of the prints sent out should be a matter for continual watchfulness. As far as is possible negatives should be made of a standard quality for easy printing, but a falling off in that respect is sometimes unavoidable in the exigencies of commercial practice. That circumstance should not be permitted to excuse the passing of any less perfect print than the negative is capable of. If a supply of "hard" and "soft" bromide paper is kept available in addition to the normal grade, it is a great help with negatives of varying contrast, but to the writer it is a matter for constant wonder how little is known or used of the variations that can be secured in a single normal grade of paper merely by modification of the printing light and of the developer. Dimming of the light, effected either as in some printing-boxes by moving it farther from the negative, or preferably by the insertion of from two to six layers of tracing-cloth assists in getting quality when negatives are thin; while the temporary use of a lamp of higher power will automatically reduce an unusually hard and dense negative to normal printing quality.

For bromide paper it is seldom necessary to use a stronger lamp in the printing-box than 20 or 30 watts, but for gas-light paper the stronger the lamp the better, for in that class of emulsion a strong light only reduces the exposure required, and does not, as in the case of bromide paper, affect the gradation or quality of the result. Many printers, when faced with a "hard" or contrasty negative, habitually over-expose the print. Undoubtedly this has the desired effect of flattening out the gradations but only at the expense of a good colour and "quality." Naturally the exposure must in any case be sufficient to penetrate and print from all but the very highest "lights," but if instead of exposing still farther, one employs a diluted developer, so as to print and develop out such faint portions before the deep shadows are clogged up, it is far preferable. This habit of over-exposing is often based upon the sluggish action of "M.Q." developer when used below 65° F. Good gradation is impossible in such circumstances.

Again, it pays occasionally to make up a developer of plain metol to replace the popular "M.Q." (that is, leaving out the Quinol, or Hydrokinone as it is generally called). Metol alone is far less liable to give that objectionable greenish tone to over-exposed shadows in bromide prints, and so are single solution developers of the Azol and Rodinal type. When used in dilute form this quality is particularly noticeable and appreciated.

Furthermore, if the negative happens to be a little on the thin, or flat side, either because of original over-exposure, or under-development, or even because the subject itself was flat, one can work wonders merely by using a developer of just double the normal strength, with the addition of from one to four drops per ounce, of 10 per cent potassium bromide solution. At the same time a light dimmed down so as to need about four times the usual exposure, or rather so as to need a little more exposure from the thin negative than a normal one needs with a normal light, will greatly assist in obtaining the sort of result aimed at.

With all these possible variations, in each grade of paper, with the possibility also of local shading, it is a poor negative indeed that fails to produce a satisfactory print; and, as can never be too often stated, *the print is all the customer gets.*

Don't Use Cold Solutions.

Was it pointed out that M.Q. developer works best at between 65° and 68° F. ? If so, let the fact be noted again ! The "Q" part of it slows down at 62° and stops work altogether at 58°. In spite of its great convenience, and almost universal application, cold "*M.Q.*" is *probably the cause of more poor photography than any other factor.* It is a very poor policy, too, if the printer is expected, for nine months of the year, to keep on warming up his developer. It is wasteful of time, and conduces to variability of results and of temper. Arrangements for keeping solutions reasonably within temperate bounds are easily devised, and help enormously to keep trouble away too.

"Amidol or M.Q. ?" is a question that crops up in every printing room. Notwithstanding everything that has been said or written, neither gives better, richer prints, or sulphide tones than the other. Nothing is easier than to cut a print in halves, develop the pieces to the same depth (or for the same time at the same temperature) in the two formulae, and treat them subsequently together. This sort of test, carefully carried out, saves many wordy arguments. Amidol takes less time to make up, by a few minutes, but as it does not keep for more than two days it has to be made up three times a week, instead of once for M.Q. Amidol needs less capital outlay, by a few shillings, but costs a tiny fraction more per pint of working developer, and it does no more work. An operator who goes about with Amidol stained finger-nails is not an advertisement to any firm.

The advantages of "M.Q." are that it is so suitable for all kinds of work, without being really unsuitable for any. For tank development of plates it is as good as any other formula, and the same applies to dish development and to bromide and gaslight printing. For lantern-slides it is excellent, whether for tone or diagram slides, the only alteration in formula being addition of more or less water to the stock solution.

Even for making line negatives upon process plates, if the exposure be correct, undiluted M.Q. with a little added bromide, gives a perfect "stencil" negative unless the originals are unusually poor, when only the "hydrokinone-caustic" formula can do the work. Even so it is a moot

point whether one should go to the trouble of making up special developer when only a few copies are to be made, since intensification of the negatives, or printing upon a vigorous gaslight paper, will secure results every bit as satisfactory.

N.B. Cold M.Q. produces poor prints.

M.Q. is liable to cause a skin trouble with some people. Once this is contracted it soon disappears on using another kind of developer, but the victim is liable to a repetition, so that an agent other than metol should be adopted permanently. In rarer cases Amidol causes inflammation, and M.Q. does not.

Warm-tone Papers.

Little mention has yet been made of the deservedly popular type of paper known under a variety of trade names, or collectively under the headings of "chloro-bromido," "slow-contact," or "warm-tone" paper.

Undoubtedly there is a charm about the prints obtained upon these papers, from the right type of negatives, that is difficult to analyse. It is supposed that they give a longer scale of gradation than bromido papers, but in the writer's experience with prints on both kinds of paper made from negatives of subjects containing a particularly extended range of steps, at both ends of the scale, there is nothing to choose between the two types of paper in this respect.

The writer has himself a very decided liking for prints on the warm-tone papers. He has, however, during business hours to please other people, and has, therefore, from time to time, made the experiment of placing prints of the conventional black, with a glossy surface, along with duplicates upon warm-tone papers, before clients and others, with no other remark than an inquiry as to any preference. When any particular choice has been declared the bromide print has nearly always won.

This is not the place to theorize upon psychological reasons, but it is useful to record the fact, with the sole qualification that the prints used in such tests have always been of subjects within the usual practice of the average commercial photographer.

A Disadvantage of Warm Tones.

There is one other factor of the case that should not be forgotten. If one copies a print upon one of the warm-tone papers it will be found that a far better negative is obtained upon a colour-sensitive plate than upon the conventional "special rapid." This is because the colour of the warm tone print is of a non-actinic colour, more especially when it tends to a greeny-brown. When the prints are for subsequent reproduction, as so much commercial work is, it should be remembered that the half-tone process is practically colour-blind also, as few engraving firms would trouble to use a panchromatic plate and filter just because the original was not of a pure black tone. The shadow detail in the printing from the block, though, would suffer, and in consequence, the photographer's reputation.

Therefore, even if warm-tone prints are supplied to a client for the sake of their attractiveness, in the case, for instance, of pictures for display in shop windows, or upon the office wall, glossy bromide duplicates should be recommended when half-tone blocks are under discussion.

System in the Printing Room.

In the printing room every possible effort should be made to work systematically and to arrange fixtures to that end. The kinds and sizes of paper most often used naturally will be placed nearest to hand. The dusting brush will either be kept hanging upon a good sized nail, by means of a large hole in its handle, so as to make it easy to pick it up and put it back quickly, or it will be hung from the ceiling on a cord, part of which is elastic. If prints are to be numbered a pencil is hung up in the same way. If left lying upon the bench, the time spent in hunting for brush or pencil will amount to several times the cost of either, in the course of only a week. Similarly vignetting cards, shading tissues, and the like, will be stored in pigeon-holes (if they be only three-halfpenny margarine boxes) rather than have them lying promiscuously on printing-box and benches.

A Handy Enlarging Accessory.

The same refers to the vignetting and shading cards used in enlarging, as well as to a very convenient little device not

so universally seen as it might be. This is a length of stiff wire, 2 to 3 ft. long, doubled and twisted up to make a handle like that of a toasting-fork. At the one end it is bent into a loop or hook, by means of which it is kept hanging behind the enlarging easel or in a similarly accessible spot. At the other end the bend takes a form after the style of a paper clip, so that an odd scrap of paper or card can be slipped in and torn or bent roughly to the shape of any internal portion of a picture that needs holding back. This device allows such local shading to be done without the hand coming anywhere near the image and so inadvertently cutting where such is not required.

Saving Time and Trouble.

It is a very good plan indeed before printing a batch of negatives to sort them out into densities, or rather into varieties of contrast. It is ever so much easier and quicker to print a series of one kind, than to be continually changing about from one treatment to another. Similarly, one should not have to be continually tearing off trial strips for each negative. While a "trial" is developing is a convenient time for cutting up a small batch of strips. Similarly, those odd minutes can be employed in a number of useful ways.

For instance, if the order is for a dozen prints, the period of developing the trial can be given in part to counting out the required paper. It is only in dark-rooms where work runs very much in ruts, or where quality is not an important matter, that trial slips can be dispensed with, and that is a part of the work that takes up a lot of time if not systematically carried out. For instance, if the hands are wetted, rinsed, and dried, for each trial slip, the time taken up for finding correct exposure will easily run into from four or five minutes, so that with a difficult negative, needing setting up, a quarter of an hour will go by before printing proper has commenced. There is no need at all to wet the fingers in developing trials if the knack is got of flicking them under the solution, and of rocking the dish by a touch underneath. Even if a pair of tweezers is not kept handy to take "trials" through the hypo there is not the slightest need to wet more than the tips of a thumb and finger up to the first

knuckle. When the hands must be wetted, though, a decent supply of proper towels to effect rapid and thorough drying, is not only a very great comfort, but saves a lot of time and temper and trouble in the course of a single day.

"Double-trials."

In printing from negatives exhibiting the variety of subjects and circumstance that obtains in much commercial work, the printer has a much greater problem than in the case of studio negatives which are tank-developed in batches to a fairly uniform printing quality. Especially is this the case if the photographer sets himself a high standard of quality plus speed.

A very great help towards making the best possible print from each difficult negative is to establish definite methods of making "trial strips." Regulating the temperature of the developer, and refraining from overworking it, are two of the necessary conditions, and a reasonably constant time for full development is another. This means that a good easily-readable thermometer, and a large dialled clock for timing, are essential items of the printing-room equipment. The thermometer should be one which can be left in the dish when desired, and preferably one which has some bold marking at the 65 to 68 region, between which marks the top of the column of mercury is clearly and unmistakably seen in the yellow light. I know of no better thermometer of this kind than that sold by Messrs. Ilford for use with their papers. It is equally useful for any other material on the market. It is shaped specially for use in a photographic dish.

Instead of making a bold (and sometimes bad) guess at what treatment a negative needs, followed perhaps by successive trial prints, it is a very good plan to examine the negative critically and to select definitely two details. The first of these should be the densest item which must just print through, and the other should be the weakest part in which detail must not run into the black shadow alongside it. Having selected these details, a small piece of paper is taken, which need seldom exceed, say, 4 in. \times 1½ in. on a half-plate negative, and this is folded along its length,

emulsion side outwards. With this it is easy to make two trial exposures, one on each side of the folded strip, taking care that the selected "dense and thin" details will be on each. The first exposure can be the guessed (it would be more polite to say the estimated) one, and the second side of the folded strip should have an exposure considerably different from the first one. The difference should not be less than 25 per cent, and in the case of really "funny" negatives, it may well be 50 per cent more or less than the estimate. If the negative is dense or veiled, the estimate should be increased for the second exposure; if on the thin side it may well be reduced.

What the Double-trial Tells.

The whole strip is then opened out and developed for the *full standard time*, irrespective of "how it comes up." For bromide paper two minutes is a good standard time. When the strip has been fixed and the light is turned up, this "double-trial" (which has taken few seconds more than a single one to make) will be seen to afford an enormously greater amount of definite information than a single haphazard test strip can ever do. For instance, if the guess was right, or nearly right, the fact is proved unquestionably. If wrong, comparison between the two strips will show—

1. Whether the right exposure should be between the two, and if so, towards which side it should lean.
2. Whether the right exposure should be more, or less, than either, and it will afford a fair indication of the proportion of increase or decrease required.
3. If, and where, shading will be required, or
4. If paper of a different grade of contrast is desirable.

It is often seen that the darker side of such a "double-trial" is right for the high-lights, and the lighter side is better for the shadows. If the difference is slight, it is obvious that shading in printing (or subsequent local reduction of the print) will result in a print presenting the full range of gradation at both ends of the scale. If the difference is strong, it will be equally obvious that a softer paper should be tried. If both the strips are too flat in contrast, the addition of bromide to a strengthened developer will

over-exposure is at once suspect. If shorter exposures are impracticable, dimming the light is the indicated remedy.

On the other hand, if double-trials on paper of normal contrast frequently show too much contrast between the halves, or too little, attention should be directed to production of negatives, either as regards more accurate exposure or alteration of developing time, so as to make them of the right quality for printing on normal paper.

In cases of dispute, the production of a double-trial will sometimes convince an operator that not the printer but his own negative is at fault.

Counting Out Paper.

The best and quickest way to count sheets of paper is the "fanning" method adopted by the letterpress printer.

One point here is very easily overlooked: if the counted-out sheets are laid over a box, and overlap one another, it is surprising how little light, creeping underneath, will fog the naked edges of emulsion in the course of printing, and there are often little crannies in window-shutters, enlargers, and printing-boxes, that leak light in unsuspected directions. Therefore all paper should be laid face downwards upon a flat surface. It is a great convenience in a printing room to have a large flat box or two with easy fitting lids that lap well over, into which counted out or exposed sheets can be placed and covered safely by a touch when it is desired to turn up the bright light.

Avoidance of Need for Spotting.

It will be agreed that spotting of prints is not a department whose work should be unnecessarily increased. Perhaps it will not be so generally acknowledged that spots upon a print are in the highest degree objectionable. It is true that the general public do not, as a rule, notice white specks, unless they be large or numerous. Yet if two prints, otherwise identical, one of them spotty and the other not, be submitted to people of differing types, with a request to choose the better one, an instant decision will always be given in favour of the unspotted one, even though the person asked may not be able to give a reason for his choice. The actual reason is that white spots, even if not recognized as

cure a slight softness, but extreme flatness will often call for a more contrasty paper.

Time Saved and Troubles Solved.

It is necessary to emphasize that such a "double-trial," fully developed, of course, will not only be much quicker to make than two successive tests, but will provide much more information of a very definite character, as outlined above. In some cases the method will prove even more things than those. I remember a case in which I was consulted, where the printer was seldom able to obtain really bright prints. He also had great difficulty in judging the depth at which to take his prints out of the developer. To overcome this trouble he was in the habit of using a more contrasty paper than the negatives seemed to warrant, and the prints therefore were not of really good "quality." Increasing the development time of plates did not go far to correct matters, even when taken to the extent of making them almost too dense to enlarge from!

Naturally, the developer itself seemed suspect, so I took along some of my own. A negative was put on the printing-box, and the printer was asked to make a trial print his own way. Silently I timed his exposure and development. The latter was actually only about 45 seconds. I got him to make a second test with a double strip, giving half his exposure on one side, and a quarter of it on the other. Developing this for two minutes made both halves altogether too dark. To give less exposure still was impracticable to time, as it would entail such a rapid movement of the switch that no accuracy could be obtained.

My next step was to open up the printing-box, on which I found that it was fitted with a couple of 60-watt gas-filled lamps, and had evidently been intended for gaslight printing. Taking these out, I put in a single 40-watt lamp and laid two or three sheets of tissue paper under the plate-glass top. The same negative was then replaced, and a second double-trial made. Full development of this gave an almost perfect result right away. The first test had proved consistent over-exposure to an over-strong light to be the cause of all the trouble, and I have met with several cases of similar nature. Whenever *full* development of a trial makes it too dark,

over-exposure is at once suspect. If shorter exposures are impracticable, dimming the light is the indicated remedy.

On the other hand, if double-trials on paper of normal contrast frequently show too much contrast between the halves, or too little, attention should be directed to production of negatives, either as regards more accurate exposure or alteration of developing time, so as to make them of the right quality for printing on normal paper.

In cases of dispute, the production of a double-trial will sometimes convince an operator that not the printer but his own negative is at fault.

Counting Out Paper.

The best and quickest way to count sheets of paper is the "fanning" method adopted by the letterpress printer.

One point here is very easily overlooked: if the counted-out sheets are laid over a box, and overlap one another, it is surprising how little light, creeping underneath, will fog the naked edges of emulsion in the course of printing, and there are often little crannies in window-shutters, enlargers, and printing-boxes, that leak light in unsuspected directions. Therefore all paper should be laid face downwards upon a flat surface. It is a great convenience in a printing room to have a large flat box or two with easy fitting lids that lap well over, into which counted out or exposed sheets can be placed and covered safely by a touch when it is desired to turn up the bright light.

Avoidance of Need for Spotting.

It will be agreed that spotting of prints is not a department whose work should be unnecessarily increased. Perhaps it will not be so generally acknowledged that spots upon a print are in the highest degree objectionable. It is true that the general public do not, as a rule, notice white specks, unless they be large or numerous. Yet if two prints, otherwise identical, one of them spotty and the other not, be submitted to people of differing types, with a request to choose the better one, an instant decision will always be given in favour of the unspotted one, even though the person asked may not be able to give a reason for his choice. The actual reason is that white spots, even if not recognized as

cure a slight softness, but extreme flatness will often call for a more contrasty paper.

Time Saved and Troubles Solved.

It is necessary to emphasize that such a "double-trial," fully developed, of course, will not only be much quicker to make than two successive tests, but will provide much more information of a very definite character, as outlined above. In some cases the method will prove even more things than those. I remember a case in which I was consulted, where the printer was seldom able to obtain really bright prints. He also had great difficulty in judging the depth at which to take his prints out of the developer. To overcome this trouble he was in the habit of using a more contrasty paper than the negatives seemed to warrant, and the prints therefore were not of really good "quality." Increasing the development time of plates did not go far to correct matters, even when taken to the extent of making them almost too dense to enlarge from!

Naturally, the developer itself seemed suspect, so I took along some of my own. A negative was put on the printing-box, and the printer was asked to make a trial print his own way. Silently I timed his exposure and development. The latter was actually only about 45 seconds. I got him to make a second test with a double strip, giving half his exposure on one side, and a quarter of it on the other. Developing this for two minutes made both halves altogether too dark. To give less exposure still was impracticable to time, as it would entail such a rapid movement of the switch that no accuracy could be obtained.

My next step was to open up the printing-box, on which I found that it was fitted with a couple of 60-watt gas-filled lamps, and had evidently been intended for gaslight printing. Taking these out, I put in a single 40-watt lamp and laid two or three sheets of tissue paper under the plate-glass top. The same negative was then replaced, and a second double-trial made. Full development of this gave an almost perfect result right away. The first test had proved consistent over-exposure to an over-strong light to be the cause of all the trouble, and I have met with several cases of similar nature. Whenever full development of a trial makes it too dark,

over-exposure is at once suspect. If shorter exposures are impracticable, dimming the light is the indicated remedy.

On the other hand, if double-trials on paper of normal contrast frequently show too much contrast between the halves, or too little, attention should be directed to production of negatives, either as regards more accurate exposure or alteration of developing time, so as to make them of the right quality for printing on normal paper.

In cases of dispute, the production of a double-trial will sometimes convince an operator that not the printer but his own negative is at fault.

Counting Out Paper.

The best and quickest way to count sheets of paper is the "fanning" method adopted by the letterpress printer.

One point here is very easily overlooked: if the counted-out sheets are laid over a box, and overlap one another, it is surprising how little light, creeping underneath, will fog the naked edges of emulsion in the course of printing, and there are often little crannies in window-shutters, enlargers, and printing-boxes, that leak light in unsuspected directions. Therefore all paper should be laid face downwards upon a flat surface. It is a great convenience in a printing room to have a large flat box or two with easy fitting lids that lap well over, into which counted out or exposed sheets can be placed and covered safely by a touch when it is desired to turn up the bright light.

Avoidance of Need for Spotting.

It will be agreed that spotting of prints is not a department whose work should be unnecessarily increased. Perhaps it will not be so generally acknowledged that spots upon a print are in the highest degree objectionable. It is true that the general public do not, as a rule, notice white specks, unless they be large or numerous. Yet if two prints, otherwise identical, one of them spotty and the other not, be submitted to people of differing types, with a request to choose the better one, an instant decision will always be given in favour of the unspotted one, even though the person asked may not be able to give a reason for his choice. The actual reason is that white spots, even if not recognized as

such, "catch the eye," and cause a certain strain, whereas the subject of a clean print can be examined comfortably without such distraction of the attention. This leads me to a cause of spots that a junior assistant is often found to encourage. He may be ever so sure that he dusts each negative as he places it in position. If his movements are watched, however, it may be seen that he merely moves the dust on to another part of the printing-box, and that the swirl of air caused by raising and lowering the contact-flap of the box only serves to circulate this dust, some of it being sucked back again upon the negative. In the dim light it may not be noticed, but that is precisely what happens very often. Moreover the springs and so on of the contact mechanism accumulate dust with similar effects. Similarly, a worried assistant may scratch his head, and be surprised by fine white lines upon the prints!

When "Everything Goes Wrong."

It is not a bad plan in a printing room to have a set of sample prints mounted and hung up. Not only do these, if of first rate quality and of various styles, provide a stimulus and a standard to keep up to, but also are found very handy sometimes for purposes of comparison when a difficult subject is struck. There are days in every printer's experience when everything seems to "go wrong," and the easiest negatives fail to produce a satisfactory print. The best cure for this state of affairs, which usually is the result of eye—or brain—fag, is a wash and brush up, a freshly-made cup of tea, and a quiet stroll for half an hour in the fresh air. It is undoubtedly the case that in continually reproducing all sorts of things into tones of grey, the mind is liable to get quite false ideas. It is also a fact that many of the grey tones in which we print are untrue to life, so that there is actually always a sort of mental strain in the brain of the good printer, in trying to effect a compromise between various grades of fiction.

Prints for the Bleach-out Process.

The commercial photographer frequently is called upon to make a print or enlargement upon which a line drawing is to be made in Indian ink. The print usually is made to

specified dimensions as a guide for the draughtsman, and when the drawing is complete, or before, the image is bleached away, leaving the ink lines on a pure white base. The drawing ink used must obviously be of the "fixed" variety, which contains a proportion of shellac or other insoluble binding matter. The usual bleaching method consists of the iodine-cyanide reducer.

The smell of cyanide is obnoxious to many people, and its very intensely poisonous nature renders it objectionable to many others. The image, converted into silver iodide by immersion in iodine solution can be dissolved away in a strong hypo bath but rather slowly. The writer has devised a simple variation of the procedure which at the same time is appreciated by the artist and permits of hypo fixing with rapidity. The method is to over-expose the print very much and give a short immersion in a developer to which a good dose of 10 per cent potassium bromide solution has been added, say, four or five drops to each ounce. The result is a print of a rather washy green tint, in which all details are plainly visible, but upon which the progress of the black ink drawing can be far more easily watched than upon a print of the conventional tone and depth. A further feature of this method is that the character of the image is one of a tiny quantity of very finely-divided silver. This is acted upon by the reducing solutions with ease and speed.

Solutions Required.

The iodine solution requires no skill to make. It is fairly expensive to make up, but it can be used over and over again till exhausted, does a lot of work and is useful in other directions, besides which it never goes wrong unless other ingredients get in, so it is really quite cheap in the long run. Potass. iodide is easily soluble in water, say an ounce to a pint; the only other ingredient is pure iodine, which will not dissolve in plain water but is easily absorbed by the potass. iodide solution. Iodine flakes are therefore added to the above till a rich port wine tint is attained.

This mixture will turn the whole print a deep brown, and the paper itself blue. As soon as the image appears like a more or less dim negative the solution is poured back and strong hypo solution is poured on (half a pound of crystals to

far more quickly than a lot of stale stuff diluted by a dripping wet print, and some of the time "lost" in washing is made up. When possible, no spirit is used, but in any case the artist will save time in working upon *clean* gelatine. One client admitted that by waiting for the one extra minute he gained an hour in working up a single half-plate print.

CHAPTER IX

PRINTS FOR REPRODUCTION

It would not be possible to say what proportion of the commercial photographs made everyday are predestined to reproduction by half-tone block. In any case, the proportion is a very big one, for in an immense number of cases the photograph is merely a means to that end. There are many photographers, it must be admitted, who do not always know definitely the kind of print most likely to reproduce to the best advantage.

"Bright" Prints?

This arises to some extent from two very prevalent misconceptions. The first is a natural consequence from the frequently reiterated demand for "bright prints," which is, perhaps naturally, translated into a preference for those of violent contrast. The second misconception is that the half-tone block must necessarily degrade the contrast of the photograph, and that therefore the print should be rather "contrasty" in order to counteract this tendency.

Both these ideas can be proved to be erroneous. There were days, admittedly, when both bromide paper and blocks were usually so very lacking in any approach at brilliance that such constant reminders were needed, in order to urge the people concerned not to slacken in their efforts to instil at least a little brightness. To-day, however, the conditions are very different altogether. To get a right outlook on the matter, let us take the everyday matter of copying a print in the camera, not by half-tone but on a dry-plate. What happens if the original is rather on the "hard" side? Merely that if one "goes for" the whites and the lighter tones, the heavy shadow details will be so under-exposed in the negative that they run together into blackness in the print. If one exposes for these shadow details, the high-lights tend to result in a range of delicate lifeless greys. So in either case the copy is not like the original "brilliant" print, and usually is much poorer in quality.

Easy-copying Prints Best for Half-tones.

As everyone who frequently makes copies knows, the type of original that is easiest to copy well, and from which the result is nearest to the original, is one which has practically no real blacks (except perhaps for a spot or two here and there), and in which any high-lights have plenty of "tone" around them, rather than those in which the pure whites blend imperceptibly into the palest of silvery greys. Even if his "original" be rather on the side of soft contrast, the photographer knows that he can increase the contrast of his copy negative and so obtain a final print which is actually better and brighter than the original without losing any detail or gradation.

When it is realized that half-tone reproduction is merely another method of camera-copying, but on far more contrasty emulsion than the commercial photographer employs, it will be understood that the best possible results are not to be expected from photographs which consist mainly of white and nearly white patches on the one hand, and intensely black and nearly black patches for the rest. The engraver much prefers a print of which all the gradations come within the easy-copying scale, and which consequently gives him less local "fine-etching" to do. He, too, can very easily brighten up a block from a print which errs on the soft side.

Not "Hard" Prints.

It is true that a half-tone proof cannot, by its very nature, be quite as brilliant as a full-tone bromide print, but that loss is inherent in the process and cannot be made good in advance by making the original "harder."

As soon as the fact is properly realized that one cannot expect the best block from a print which is very black and very white, it is sincerely to be hoped that the reader will not immediately raise his eyes to heaven in disgust and exclaim that here is Charles saying that flat prints make the best blocks! Because he isn't, and they don't. All I am trying to show is that the kind of brightness that prints for reproduction certainly do need does not arise from their possessing lots of heavy shadows and big areas of almost blank whites. The row of boles in front of a black firegrate

can be as black as you like, but then the front of the piece must be several definite tones lighter. It is no good saying, "Look there, you can see them." The difference must be obvious and definite if it is to show clearly and not "bung up" in the block.

Get it in the Negative.

Thus, the contrast so necessary in bright prints for reproduction is no longer a matter of simply using a contrasty grade of bromide paper. *It must be got in the original negative* If the various details of the original subject contrast with one another in tone, nothing more is needed to make a good reproduction photograph than perfectly straightforward photography. If, on the other hand, the details of the subject are much of the same tone, the desired brilliance and relief can be obtained from light cast on to dull-looking surfaces, and from shadows thrown by their projections. *That* is the sort of contrast block-makers need.

The very best test that can be applied, to tell if a print is of the right sort for reproduction, is not a photographic one at all! If the print gives a true illusion of the original subject, to the extent that somebody looks sideways at it, to see whether the details are not actually *standing out* from the paper, there is not much doubt that the print is right! Every commercial photographer should try (it is not easy, I know) to forget his "photography" when examining a print to see if it is right. He should try to cultivate the habit of looking *at the subject* on it. If he feels that he could actually turn over the leaves of that book, cut and eat that cake, open the door of that car and jump right in, there cannot possibly be much wrong, because there is the subject "alive" on the paper. If no one has ever remarked how "real" his photographs look, or no one has ever been known to put his hand out to stop those eggs from rolling off the table, or to attempt to lift an object from the face of a print upon the wall, the photographer may be sure that his prints do not reach the highest possible standard either for reproduction or for any other purpose.

When it has been decided that the subject on a print does not look quite "real," then is the time to analyse it "photographically" to determine what is wrong, and what technical treatment will put it right.

CHAPTER X

INTERIORS AND FLASHLIGHT

Interiors.

THIS brief heading includes a greater variety of problems than appears upon the surface. There are, of course, rich interiors of the type that produce prints to delight the heart of the paper-maker's representative; full of glistening detail and handsome decorations, which extend right into the shadows. That sort of interior usually possesses large areas of window from which ample light reaches, directly or by reflection, every part. Given reasonably fine weather, and a respectable lens, such subjects present no real difficulty.

By all means let the commercial photographer, when he gets the chance to photograph a wealthy home or a magnificent hotel, make a set of specimen prints and collect all the admiration he can get for them from prospective clients. Specimens should always be of *attractive* subjects, not necessarily *difficult* ones. They may be of difficult subjects or of those that *look* difficult (not always the same thing), but it is undoubtedly bad policy to show a prospective client anything that does not *look* "up to scratch," except in the very rare instances when the prints submitted are of subjects he is interested in, and *knows* to be of exceptional difficulty, or when they are of a topical interest.

More About Halation.

The handicaps connected with photographing interiors are usually summed up in the word "halation." This is certainly one of the biggest, but by no means covers the whole range of troubles that may be encountered. However, it may be useful to explain further some of the factors that tend to produce, or exaggerate, halation, or spreading of light, which is lessened, but by no means eradicated, by the use of film, or of backed plates. The part of halation that is produced by reflection of over strong lights in the support, glass or celluloid, is not only worsened when the emulsion is of a rather transparent nature, such as that

of a "Special Rapid," or slower speed, but is liable to be still more accentuated for another reason. Such plates are so very insensitive to the shadow detail, especially when it comprises dark furniture and the like, that in attempting to expose for this the lights become very much more over-exposed than they would otherwise be, and there is little density in the gelatine emulsion to prevent the foreible highlights from penetrating and from being reflected, and re-reflected to and fro in the glass and film, each time at a farther distance from the original point.

Now the greater density of more rapid emulsions and of the dyes in such plates as the self-filter and panchromatics, not only to a very considerable degree absorbs these over active rays, and prevents them from reaching through the coating with anything like their full energy, but their added sensitiveness to dim shadow detail allows of less over-exposure to the strong lights. The only exception, in the writer's experience, is the type of rapid plate issued for press photography. This has a film one of whose characteristics is rapid fixing, and it may be taken that a plate which fixes slowly is, because of its rich and dense coating, less liable thereby to halation.

Wide-angle Views.

Commercial exigencies often run counter to "canons of art" as regards the amount of an interior included on the plate from any given viewpoint, and as regards the steepness of perspective resulting therefrom. The "difficulties" connected with making of "interiors," after halation, consist mainly in the physical problems dependent upon working accurately in cramped quarters. In other words, they are chiefly matters either of bodily discomfort, or of inconveniences of the apparatus used. A special camera, designed by the writer to abolish these difficulties, is now upon the market. Its features are illustrated in Figs. 6 and 7, and described on page 14.

Lenses and Interiors.

These have already been discussed in the chapter on "Choice of Apparatus." When interior photographs are made, as is the case nowadays with increasing frequency,

to illustrate the quality of the artificial-lighting installation, none but the very finest lenses will do the work really satisfactorily. They should also be kept very religiously clean, for it takes but a minute amount of dust or condensation on the surface of the lens to diffuse alarmingly the images of lamps. The exposure in such subjects must be made, as in all others, with regard to the darkest shadow, and therefore the lamps seen will be over-exposed by some hundreds of times, and so will any spreading of them caused by faults, either in the design or the condition, of the lens.

For that reason many lenses which are quite good for more usual kinds of interior photograph, fail miserably for those which are taken solely by the light of the installation they are to illustrate. Moreover, when such pictures are required by the lighting engineer, it is essential that no other light be used for making the picture than that emanating from the actual lamps to be illustrated. The best lenses for this purpose are the very small-aperture type of wide-angle anastigmat. These are slow, but the definition and freedom from troubles are wonderful, provided that the little surfaces of glass are kept clean.

On the other hand, there are many occasions when it is required that people actually at work should be included in such an interior, in which case it is impracticable to use such a slow lens, and one must be satisfied with a narrower angle of subject. In my experience it is better for these cases to make a big jump in the selection of a lens to the diametrically opposite kind of anastigmat working at an aperture of $f\ 4.5$. A really good one of certain makes will act as a fine moderate-wide-angle lens on a plate larger than the one it is listed for, even against the light, but one may need to be satisfied either to enlarge, or else with dark corners to a slightly small print, in payment for a fine brilliant centre containing people showing no signs of "moves." There is just one point in connection with the use of a lens upon a larger plate than its listed covering-power, especially when using it for against-the-light interiors. It is that a lens of $f\ 6.8$ aperture is very little slower than one working at $f\ 6.3$, but the minute loss in full-aperture speed is often more than counterbalanced by extra covering power, and freedom from glare troubles. Of

makes a rapid choice. This instinct is not difficult to acquire. It merely means a little practice, by regarding every place one walks into as a "subject," and deciding which is its most attractive or interesting aspect.

Uprights Essential.

Uprights that are not upright constitute a fault in an interior photograph (or in an exterior, for that matter) which is quite inexcusable. The writer once showed a newly-made negative of the Great Hall, at Hampton Court, to the curator there, pointing out that a certain wall was leaning. The custodian replied sarcastically that he was well used to that phenomenon in architectural photographs, but that the other photographers had always blamed their lens, and not the poor maligned buildings. It was then pointed out to him that other walls in the same negative were close to, and absolutely parallel with, either edge of the glass; whereupon the said gentleman decided to sit up and take notice, with the result that unemployment in the building trade immediately became less acute.

A spirit level, of the cross-level or boat-shape description (see Fig. 33), is inexpensive and easy to use. It is first held upright against the side (either right or left) of the camera body, so that the small tube, or cross-level, is uppermost, and to get the bubble central all that is needed is to swing quite gently the middle leg of the tripod in the same direction as the bubble should go (Fig. 47). Then the level is held upright against the ground-glass, and this brought to a dead vertical position, either by the strut movement, or by sliding the same leg of the tripod forward or backward, as in Fig. 48. In the latter case it is advisable to repeat the sideways test. In any case the whole operation takes only a few seconds, it is far more certain than, and easily as rapid as, any make-shift method.

It may be added in this connection that in wide-angle work (as well as in copying) the spirit level should also be used at the front of the camera, either against the lens panel or against the hood of the lens itself. In some instances a very slight forward slope to the front will bring in near and far detail sharply, with less stopping down, at some sacrifice of definition in the top and bottom angles of the room.

course, there are plenty of fine lenses, both fast and slow, advertised as being designed especially for wide-angle work, but the above information, from my own personal experience, is intended to assist those who are not able or to whom it would not be worth while to acquire a full range of these costly instruments for every kind and size of work they are called upon to produce.

A Lens Test for Interior Work.

A very reliable guide to the probable behaviour of any lens when bright lamps or windows form part of an interior subject can be obtained in advance without exposing any plates. It is only necessary to hang a bright and fairly large lamp where its image will come well into the view temporarily focused on for testing, and then to remove the ground-glass of the camera. Looking through the open camera, a line of dots will be observed in the lens, being images of the lamp. If these dots are many and large, and closely spaced or even overlapping, one may expect trouble to show on the negative even when the general image seems good. Such a lens may be quite excellent for much work, but should be suspect when extra bright illumination contrasts with deep shadows in the same interior view.

When it is really necessary to include a fairly wide angle, a raised position for the camera will often prevent a near detail from becoming too overwhelmingly prominent, but will at the same time introduce the tendency to an uphill appearance of the floor. The operator should use careful judgment in such cases, and effect a wise compromise between the various faults of perspective inherent in wide-angle work.

The first thing to decide upon in taking an interior is not which position will be easiest to work from, but from which the most pleasing picture can be taken. They may or may not be the same, but it is always the result which the customer gets and passes judgment on. He cares nothing whether it was easy or difficult to do, but only if it shows the place to advantage. The competent operator rarely needs to walk around to find the best point of view. Immediately upon entering he "sizes up" a room, and either goes straight to the right spot, or decides upon alternatives from which he

course, there are plenty of fine lenses, both fast and slow, advertised as being designed especially for wide-angle work, but the above information, from my own personal experience, is intended to assist those who are not able or to whom it would not be worth while to acquire a full range of these costly instruments for every kind and size of work they are called upon to produce.

A Lens Test for Interior Work.

A very reliable guide to the probable behaviour of any lens when bright lamps or windows form part of an interior subject can be obtained in advance without exposing any plates. It is only necessary to hang a bright and fairly large lamp where its image will come well into the view temporarily focused on for testing, and then to remove the ground-glass of the camera. Looking through the open camera, a line of dots will be observed in the lens, being images of the lamp. If these dots are many and large, and closely spaced or even overlapping, one may expect trouble to show on the negative even when the general image seems good. Such a lens may be quite excellent for much work, but should be suspect when extra bright illumination contrasts with deep shadows in the same interior view.

When it is really necessary to include a fairly wide angle, a raised position for the camera will often prevent a near detail from becoming too overwhelmingly prominent, but will at the same time introduce the tendency to an uphill appearance of the floor. The operator should use careful judgment in such cases, and effect a wise compromise between the various faults of perspective inherent in wide-angle work.

The first thing to decide upon in taking an interior is not which position will be easiest to work from, but from which the most pleasing picture can be taken. They may or may not be the same, but it is always the result which the customer gets and passes judgment on. He cares nothing whether it was easy or difficult to do, but only if it shows the place to advantage. The competent operator rarely needs to walk around to find the best point of view. Immediately upon entering he "sizes up" a room, and either goes straight to the right spot, or decides upon alternatives from which he

makes a rapid choice. This instinct is not difficult to acquire. It merely means a little practice, by regarding every place one walks into as a "subject," and deciding which is its most attractive or interesting aspect.

Uprights Essential.

Uprights that are not npright constitute a fault in an interior photograph (or in an exterior, for that matter) which is quite inexcusable. The writer once showed a newly-made negative of the Great Hall, at Hampton Court, to the curator there, pointing out that a certain wall was leaning. The custodian replied sarcastically that he was well used to that phenomenon in architectural photographs, hut that the other photographers had always blamed their lens, and not the poor maligned buildings. It was then pointed out to him that other walls in the same negative were close to, and absolutely parallel with, either edge of the glass; whereupon the said gentleman decided to sit up and take notice, with the result that unemployment in the building trade immediately became less acute.

A spirit level, of the cross-level or boat-shapo description (see Fig. 33), is inexpensive and easy to use. It is first held upright against the side (either right or left) of the camera body, so that the small tube, or cross-level, is uppermost, and to get the hubble central all that is needed is to swing quite gently the middle leg of the tripod in the same direction as the hubble should go (Fig. 47). Then the level is held npright against the ground-glass, and this brought to a dead vertical position, either by the strut movement, or by sliding the same leg of the tripod forward or backward, as in Fig. 48. In the latter case it is advisable to repeat the sideways test. In any case the whole operation takes only a few seconds; it is far more certain than, and easily as rapid as, any make-shift method.

It may be added in this connection that in wide-angle work (as well as in copying) the spirit level should also be used at the front of the camera, either against the lens panel or against the hood of the lens itself. In some instances a very slight forward slope to the front will bring in near and far detail sharply, with less stopping down, at some sacrifice of definition in the top and bottom angles of the room.

course, there are plenty of fine lenses, both fast and slow, advertised as being designed especially for wide-angle work, but the above information, from my own personal experience, is intended to assist those who are not able or to whom it would not be worth while to acquire a full range of these costly instruments for every kind and size of work they are called upon to produce.

A Lens Test for Interior Work.

A very reliable guide to the probable behaviour of any lens when bright lamps or windows form part of an interior subject can be obtained in advance without exposing any plates. It is only necessary to hang a bright and fairly large lamp where its image will come well into the view temporarily focused on for testing, and then to remove the ground-glass of the camera. Looking through the open camera, a line of dots will be observed in the lens, being images of the lamp. If these dots are many and large, and closely spaced or even overlapping, one may expect trouble to show on the negative even when the general image seems good. Such a lens may be quite excellent for much work, but should be suspect when extra bright illumination contrasts with deep shadows in the same interior view.

When it is really necessary to include a fairly wide angle, a raised position for the camera will often prevent a near detail from becoming too overwhelmingly prominent, but will at the same time introduce the tendency to an uphill appearance of the floor. The operator should use careful judgment in such cases, and effect a wise compromise between the various faults of perspective inherent in wide-angle work.

The first thing to decide upon in taking an interior is not which position will be easiest to work from, but from which the most pleasing picture can be taken. They may or may not be the same, but it is always the result which the customer gets and passes judgment on. He cares nothing whether it was easy or difficult to do, but only if it shows the place to advantage. The competent operator rarely needs to walk around to find the best point of view. Immediately upon entering he "sizes up" a room, and either goes straight to the right spot, or decides upon alternatives from which he

makes a rapid choice. This instinct is not difficult to acquire. It merely means a little practice, by regarding every place one walks into as a "subject," and deciding which is its most attractive or interesting aspect.

Uprights Essential.

Uprights that are not upright constitute a fault in an interior photograph (or in an exterior, for that matter) which is quite inexcusable. The writer once showed a newly-made negative of the Great Hall, at Hampton Court, to the curator there, pointing out that a certain wall was leaning. The custodian replied sarcastically that he was well used to that phenomenon in architectural photographs, but that the other photographers had always blamed their lens, and not the poor maligned buildings. It was then pointed out to him that other walls in the same negative were close to, and absolutely parallel with, either edge of the glass; whereupon the said gentleman decided to sit up and take notice, with the result that unemployment in the building trade immediately became less acute.

A spirit level, of the cross-level or boat-shape description (see Fig. 33), is inexpensive and easy to use. It is first held upright against the side (either right or left) of the camera body, so that the small tube, or cross-level, is uppermost, and to get the bubble central all that is needed is to swing quite gently the middle leg of the tripod in the same direction as the bubble should go (Fig. 47). Then the level is held upright against the ground-glass, and this brought to a dead vertical position, either by the strut movement, or by sliding the same leg of the tripod forward or backward, as in Fig. 48. In the latter case it is advisable to repeat the sideways test. In any case the whole operation takes only a few seconds; it is far more certain than, and easily as rapid as, any makeshift method.

It may be added in this connection that in wide-angle work (as well as in copying) the spirit level should also be used at the front of the camera, either against the lens panel or against the hood of the lens itself. In some instances a very slight forward slope to the front will bring in near and far detail sharply, with less stopping down, at some sacrifice of definition in the top and bottom angles of the room.

Awkward Corners.

It often happens that the best point of view for an interior is from a position that hampers observation of the ground glass, as well as, sometimes, of preventing insertion and opening of the dark slide. These circumstances should not permit the selected position being left in favour of an easier, but less

satisfactory, point of view. As to inserting the slide, and withdrawing its shutter, this can be accomplished successfully in one of several ways, according to circumstances. If the camera can be swung round upon its stand, without moving the legs, it becomes an easy matter. As soon as focusing is finished a sight can be taken along the edge of the baseboard, noting an object at the far side of the room (or placing one there) upon which the line of sight rests. The camera is then turned to any convenient angle, the slide inserted and



FIG 47. LEVELLING A TRIPOD CAMERA
First stage. See page 123

opened, and the whole turned back again till the same mark is aimed upon, when the exposure can confidently be made.

This is distinctly more accurate a method than marking the turntable, a plan sometimes adopted. In cases where this scheme cannot be adopted, assistance must be enlisted. The spot upon the floor where the nearest leg to the corner is resting is marked with a pin, a ring of chalk, or other available means. The other two legs being firmly pressed into the floor or being held by a third person, the one leg is lifted steadily away, thus swinging the camera clear, and held securely while the operator arranges the dark-slide, upon

which the raised leg is returned carefully to its former position, against the mark. The special camera previously described does away entirely with these troubles.

Dealing with Undue Contrast.

The greatest difficulties in interior work are when there are parts of extreme dimness compared with others. The negatives can be treated as described in the chapter on "Printing." Far better, if it can be done, is to illuminate the dark portions sufficiently to bring the range of contrasts within those of a "normal" subject. That should not be taken to mean lighting them equal to the brightest portions, for shadows there must be to make a successful picture. It can be done by means of flashlight, following a time exposure. Flashlight is apt to produce defined shadows of objects, and, since it will be fired usually from the corner farthest from the windows, such shadows may point towards the ostensible source of illumination, giving an appearance of absurdity to the result.



FIG. 48. LEVELLING A TRIPOD CAMERA
Second stage See page 123

Interiors by Artificial Light.

Now that plates are available of such very great sensitiveness to artificial light, it becomes possible not merely to use the ordinary lighting of a room as a help when size of windows or weather conditions are unfavourable, but even to photograph by those lights alone. Especially when the newer systems of light distribution have been installed, and

walls are of light character, as they are in modern office buildings, the photographing of an interior often is actually easier at night than it is in the daytime.

Even when the interior is of a dark description, such as a machine shop or a heavily decorated and furnished living-room, it is quite practicable to plug in extra lamps by means of some flex and adapters, and exposures are then no longer than for the same subject under the most favourable conditions of daylight. With incandescent gas illumination it is not so easy to alter or increase the distribution advantageously, but with the inverted type of burner, and diffusing globes, excellent results are obtained without unduly long exposures.

A Few Examples.

One of the illustrations (Fig. 49) shows a small waiting-room, with dark walls and furniture, lit by a small window. This is on the ground floor of a building in a narrow London street, flanked by tall houses, and in the brightest weather it is a gloomy looking room. The next photograph (Fig. 49A) was a repeat exposure of exactly the same duration, but with additional light of 500 watts, held up and kept moving by an assistant. Stop a little below $f/22$, and time 5 min. upon each. Both were tank developed together, and were made to show the benefit obtained by artificial light. During such exposures it is advisable to keep the added source of light gently moving to prevent them recording unnatural and defined shadows, especially upon the ceiling.

The next picture (Fig. 50) is the entrance hall of a cinema, with teak walls and dark bronze paybox. It was taken late on a dull rainy afternoon, with practically no daylight coming through the doorway behind the camera. The only other sources of light were the candelabra seen in the print. The exposure was under five minutes at $f/22$. The upper part of the picture naturally is printed up slightly, but there is no other "faking" at all.

The possibilities of portable half-watt lamps will be recognized on reference to Fig. 51. A long series, nearly a hundred, of photographs were taken in this factory, many of them with figures, and within three days of characteristic British winter weather, gloomy and raining. Practically



FIG. 49

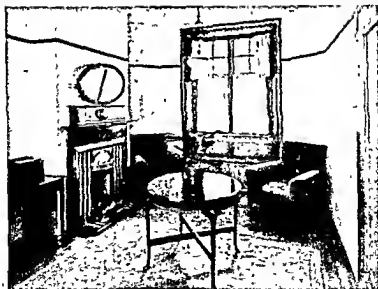


FIG. 49a

COMPARATIVE PAIR OF EXPOSURES SHOWING THE ADVANTAGE OF
PORTABLE LAMPS AND PANCHROMATIC PLATES

walls are of light character, as they are in modern office buildings, the photographing of an interior often is actually easier at night than it is in the daytime.

Even when the interior is of a dark description, such as a machine shop or a heavily decorated and furnished living-room, it is quite practicable to plug in extra lamps by means of some flex and adapters, and exposures are then no longer than for the same subject under the most favourable conditions of daylight. With incandescent gas illumination it is not so easy to alter or increase the distribution advantageously, but with the inverted type of burner, and diffusing globes, excellent results are obtained without unduly long exposures.

A Few Examples.

One of the illustrations (Fig. 49) shows a small waiting-room, with dark walls and furniture, lit by a small window. This is on the ground floor of a building in a narrow London street, flanked by tall houses, and in the brightest weather it is a gloomy looking room. The next photograph (Fig. 49A) was a repeat exposure of exactly the same duration, but with additional light of 500 watts, held up and kept moving by an assistant. Stop a little below $f/22$, and time 5 min. upon each. Both were tank developed together, and were made to show the benefit obtained by artificial light. During such exposures it is advisable to keep the added source of light gently moving to prevent them recording unnatural and defined shadows, especially upon the ceiling.

The next picture (Fig. 50) is the entrance hall of a cinema, with teak walls and dark bronze paybox. It was taken late on a dull rainy afternoon, with practically no daylight coming through the doorway behind the camera. The only other sources of light were the candelabra seen in the print. The exposure was under five minutes at $f/22$. The upper part of the picture naturally is printed up slightly, but there is no other "faking" at all.

The possibilities of portable half-watt lamps will be recognized on reference to Fig. 51. A long series, nearly a hundred, of photographs were taken in this factory, many of them with figures, and within three days of characteristic British winter weather, gloomy and raining. Practically



FIG. 50 ANOTHER INTERIOR IN EXTREMELY DULL WEATHER
Electric lights seen plus panchromatic plate "pick up" the teak and bronze
in two or three minutes

the only illumination was from three 100-watt lamps in reflectors of bright aluminium. These were fixed on long leads and plugged in temporarily at any available socket, and were just held up by a man standing on a chair, and kept

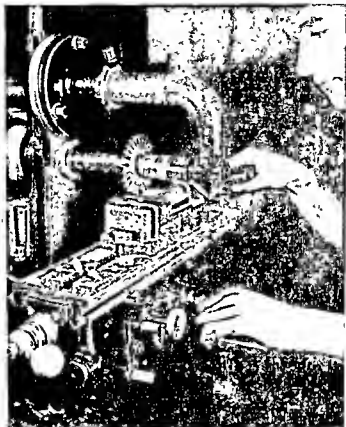


FIG. 51. EVEN IN A DARK MACHINE-SHOP
THREE 100-WATT LAMPS WILL DO GOOD WORK

moving during the exposures. At about $f/11$ these ranged from six to twenty seconds.

It is not at all difficult to get an intelligent man to remain still for that period, but girls are much more fidgety, especially, as is usual, when other people are around. Undoubtedly a figure adds human interest to lifeless machinery. The best way to pose people is to get them actually to perform an operation on their particular machine, and to stop

the action at the desired point. This results in a more natural looking attitude than to arrange the pose straight away as in a studio. By getting the worker to look at his work, as though he was to carry on at the word "go," and by persuading him to take in and hold a good deep breath, it becomes easy for him to remain still.

Shop-fronts at Night.

With a panchromatic plate and a lens stopped down to $f/22$, an exposure of from 1 to 5 min., according to the character of the display, will be found ample. On the other hand, if there is much passing traffic, it will be necessary to give intermittent exposure as one gets a chance, watching especially for people carrying white papers, and for vehicle lamps passing behind one, that will produce continuous lines of reflection. When using the intermittent method the total should be greater by about 50 per cent than if a continuous exposure can be given, to give the dark portions a chance to show themselves upon the negative. Patience is a valuable asset, since the total time taken up by an intermittent exposure in a thoroughfare like Oxford Street may run into half an hour or more. On the other hand, sometimes the whole job can be got through from start to finish in five minutes. When setting out for this work a duster should be included in the kit. Finger-marks are frequently seen on the lower portions of a window-pane and "catch the light" rather severely. It is quicker, and therefore cheaper, to wipe them off than to spot them out on the prints, even at the expense of a little of one's dignity.

Flashlight.

A most useful adjunct to the photographer's equipment. With improved reliability in ultra-rapid colour-sensitive plates, and the widespread use of gas-filled electric lamps, the advantages of flashlight are becoming more limited. However it still has a considerable field of activity, particularly where large or small numbers enter into the subject.

No mention of flashlight is complete without a word about flash-powders. Familiarity causes forgetfulness of the fact that flash-powders are explosives. Some are just th

... g.
flash-
...ain

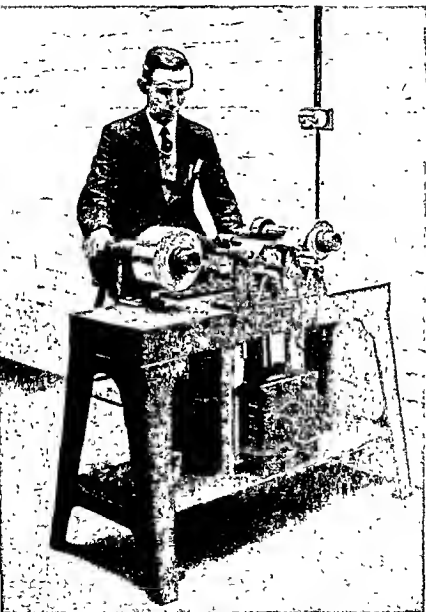


FIG. 52 A FIGURE GIVES "LIFE" AND INTEREST TO THE Dullest OF TECHNICAL ILLUSTRATIONS, IF THE MODEL CAN REMAIN STILL

kinds, especially when they have been kept in stock for a long time, become especially violent and dangerous.

Varieties of Flash-powder.

There are powders for which it is claimed that they are practically smokeless. That must be taken as only a comparative description; when large flashes, say, 2 to 6 oz. of powder, are used, the "smokeless" kinds are the only possible ones, since the volume of smoke is of a very thin nature easily driven out, while the other kinds produce fumes of a dense pungent kind that settles slowly in a white deposit.

The "better" kinds of powder have compensating disadvantages though. They are very bad "keepers" once they are mixed, are more difficult to ignite with certainty, and are slower in burning than the more smoky and perhaps cheaper varieties. The difference can be determined by the colour of the powders. There is always a grey metallic powder (magnesium or aluminium) and another chemical powder. If the latter be pure white, the mixture will be probably of the rapid, smoky sort, while if the second ingredient be of a fluffy texture, like metol, and of a cream, grey, or pink tint, the tendency will be towards less smoke and noise, and need for greater efficiency in the igniting mechanism. Whether the burns from one kind are more painful than those from the other, the writer has not yet personally investigated. Several of his friends have suffered so severely from their first test in this direction that they decline to complete the comparison.

There is another danger that is not often foreseen, in flashlight work. Some lamps are provided with a little tray of a particular shape intended to project the flame away from the hands, as well as to spread it into a large area of illumination. Such a tray should never be more than half-filled with powder. Otherwise, the explosion may be of such dimensions that the metal-work, as a shield, is practically non-existent. In the case of the "smoky" powders, such overloading can easily result in smashing the lamp, and hurling bits of it around.

With due precautions, flashlight can often be of immense advantage to the commercial photographer. A package should always be kept in stock (in a dry place) and no long

distance commission that involves interior work should be undertaken without a supply being included in the kit.

For most subjects the worst position for the flash is that very frequently adopted, namely, just over the camera. The lamp should nearly always be placed as high as is conveniently possible, the line from lamp to subject being at angle of about 45° with that along which the camera is pointing. Under suitable conditions there is no reason why flashlights should be any cruder than daylight exposures. With some lenses a small flash that comes partially within the field of the lens does not affect the result, but with others it is fatal, just as with other sources of light. It is better to screen the lens and carry the light forward towards the subject, since to take it behind the camera means loss of light due to the increased distance.

For complicated details such as machinery, two or even more flashes from different positions are sometimes desirable, especially if there are no white walls or other reflecting surfaces to assist in illuminating the shadows. In this class of subject more certain results are usually obtainable by the method of using ordinary artificial light, explained under the heading of "Interiors."

Avoiding Reflections in Flashlight Work.

When the subjects being photographed are such as to arouse a troublesome doubt regarding the probability of the image of the flash being reflected, for instance where there are polished or glass fittings, the worry can be instantly dispelled by a simple test. Someone is persuaded to hold a sheet of newspaper or other white substance, just about where the flash is to take place, while the operator observes the subject from the camera position. If the paper is moved about it will be recognized in the polished parts of the subject, if it is reflected at all, and if the paper is reflected obviously the flash would be also.

If trouble is experienced in finding a spot where no reflection at all of the paper will be seen from the camera, it may help to refer to the chapter on "Reflections" as well as that on "Copying," where the principle of avoiding reflections is explained. In the case of interiors, of course, the reflecting surfaces are not all in one plane, as in copying, so

that some reflections of the flash may be unavoidable, and discretion has then to be exercised as to the least objectionable.

If well illuminated, the development of flashlight negatives will not differ from any other kind, but since the tendency is nearly always to "hardness," a soft-working developer, such as metol, is advisable.

Flashlight Groups.

When photographing groups, or scenes in which humans take part, such as factories or schools, for instance, there are certain precautions to be taken over and above the ordinary practice for other subjects of merely focusing, inserting the dark-slide, and of then firing some powder at one's own sweet will and convenience.

Most people have a horror of flashlight. Some folk shut their eyes tightly immediately the word is mentioned; others wait till they see the photographer preparing his flash-lamp. The result, a group including some apparently blind people, is familiar. Then there is the other kind of "flashlight eye," which is fixed open in a terrified, ghastly stare, determined to see things through if the heavens fall. There is even a third kind, less often seen, of flashlight eye. This consists of definite rays of white light seen to be radiating like a searchlight from one or more pairs of spectacles. These are caused by a person wearing glasses whose image falls somewhere in the margin of field of a certain type of lens, and show themselves when the eyes behind the glasses are canted upwards towards the flash to see what the photographer fellow is up to.

All these examples of flashlight eye are interesting to observe in the finished result, but there is no money in them! They should be avoided. This can best be done by preparing the flash quietly and unobtrusively in advance. When focusing has been achieved (and that as quickly as possible) the attention of the people is attracted and held momentarily by the operator assuming, for the occasion, a loud and dominant tone (this can be done by the shyest if he is sufficiently determined to get a good picture), in which he assures his audience that there is no deception, ladies and gentlemen, or that he hopes they will feel no pain, or he makes any other equally banal remark that will detach their minds, for

one single second, from the idea of flashlight. It is in just that second, actually before he has completed his sentence, that he (or preferably an assistant at some little distance from him) fires the flash. The resulting expressions will be more of the kind that seems to be enjoying the photographer's poor attempt at wit than such as suggest the Dante's *Inferno* victims too often to be recognized in flashlight photographs.

If the surroundings are brightly lit, to the extent that double images may be expected if the lens is held open, alternative methods exist to choose from. If the photographer is using panchromatics, the normal interior illumination will certainly produce an exposure, and it is often a good plan to give some seconds of preliminary exposure before letting off the flash. Less powder, in such a case, would be required. If, however, the subjects are inclined to be fidgety, naturally it will be better to avoid any interval between opening the lens, flashing, and closing the lens again. Some press cameras are fitted for simultaneous shutter-opening and flash-ignition, but this is not at all necessary for group work. If working alone, one has the shutter release in one hand, and the flash release in the other. With the very least practice, the three movements are made in swift and efficient succession: open-flash-close—one-two-three, all in less than one second of time.

If an assistant is to fire the flash, which is much the best plan, because he can hold the flash-lamp up high away from the camera (standing on a chair if need be) without attracting the people's attention away from the more vocal cameraman, rather more rehearsal is advisable. If the operator always uses the same silly speech to gain attention towards the camera, a certain word can be emphasized as signal to fire. Or he can raise his free hand slightly, for the same purpose. The very worst form of signal is an emphatic word of command that announces "Here comes the flash." It is just asking for a lovely collection of flashlight eyes! Almost as bad is to remove the cap ostentatiously, for the flashlight man to take notice of. The audience will also take similar notice. In fact, half of them will be waiting for such a signal. Whereas, if one can only pretend that one has a few seconds to spare for a bit of preliminary banter, the flash will be over long before it is even expected.

Flash-bulbs.

For work in places where ordinary flashlight is prohibited or impossible, or in narrow quarters where the flame of a flash would be likely to intrude into the actual subject, the electrically-fired flash-bulb is undoubtedly useful. It must be quite thirty years ago that the present writer realized that sooner or later a flashlight would need to have its stroke imprisoned, and burst many a glass jam jar in his attempts to solve the problem.

The totally enclosed flash-bulb is now a regular commercial article, and so are efficient holders which combine a reflector for the light and the necessary electrical ignition device. The latter can be conveniently synchronized with the shutter. The absolute silence and freedom from fumes which characterizes the flash-bulb counterbalance, for very many purposes, its comparatively greater cost and bulk. The writer was probably the first to photograph the Queen and other members of the Royal Family by the aid of flash-bulbs, by appointments which happened to coincide with their introduction to this country.

The advantages of the silent and gentle "flick," as compared with the older forms of flashlight, are obvious on such occasions, and the safety of the bulb is not only valuable in certain exceptionally dangerous places where flashlight is normally prohibited, but is emphasized by certain instances of flashlight-caused fires which have been reported in the Press. On the other hand, where a large volume of light is required, the cost of a number of bulbs may not always be warranted, and if extreme speed is essential, the more rapidly exploding powders will prove more satisfactory.

It is of course easy to fire several flash-bulbs at absolutely the same instant, whether they are close together or far apart. In the latter case it may be advisable to use a larger battery than usual to overcome the resistance of the wiring. For any subject where dampness is likely to cause trouble, the bulb will be the natural choice in preference to powder, and it may usefully be added that the bulb can be used much closer to the subject, even actually appearing in the negative, without the risks to the latter associated with an open flash.

CHAPTER XI

PHOTOGRAPHY OF SMALL OBJECTS

THIS is often regarded as the easiest of all commercial photographic work, and as calling for the least amount of skill and of either technical or mental equipment. It is true that if a man is employed day after day in photographing, let us say, firegrates, that he will very soon succeed in establishing data and conditions that allow him to carry on photographing firegrates almost with his eyes shut; until one day he is ordered to photograph one decorated in mother-of-pearl or in stainless steel, and he finds that his standard methods are entirely off the map for these! Nor could he apply his same familiar methods with any degree of even reasonable success to such subjects as shoes, plaster casts, tennis racquets, table cutlery, scent bottles, or oil-paintings, each of which require some special individual departure from the method of photographing any of the others in even that short list. That is, of course, if first-rate results are required.

Not Any Photograph.

It is obvious to the meanest intellect that if any sort of camera is pointed at an object, and some sort of exposure is made by means of any light that happens to be shining on it, that there will not be much doubt in the final result as to whether the subject of the photograph was a flower-pot or a sewing-machine. But simply to make a record that a certain kind of object happened to be in front of the camera when the shutter was fired is not commercial photography.

There are so many things that can be done: firstly, in placing the object itself; secondly, in directing light upon it; thirdly, in directing and adjusting the camera and lens; fourthly, in selecting the kind of plate and treating it under the subsections of colour-recording and contrast-recording; and lastly, in printing control, that the number of possible variations, and of combinations of variations, *any one of which will make a definite difference in the finished result*, amount to many thousands!

Therefore, the commercial photographer has at his disposal a tremendous assortment of avenues for error! He is handed half a dozen subjects of entirely different nature, from a pair of chamois-leather gloves to a drainpipe, and has very rapidly to select in each individual case the combination of methods best adapted to producing the best possible result. He has to make a diagnosis and perform a successful operation in each case with almost the same speed as a panel doctor writes prescriptions, but with greater risk to himself if he makes a mistake. And there are not wanting people who say that there is no skill in photographing small objects!

Problems of a "Simple" Subject.

I would draw the reader's attention to the four representations of a very simple cylindrical object, shown in Fig. 53. Fig. 53 (A) is a straight-on view, made on an "ordinary" plate; this is a simple elevation, quite satisfactory for use as a record, or in the pattern-shop, but not entirely so perhaps for the advertising catalogue. Instructions to make a further same-size photograph, to show "more of the top" (Fig. 53(B)), immediately bring in their train technical experiences which are unfamiliar to many. Using a long-focus lens to avoid distortion is found by no means to avoid it altogether, or even to a negligible extent. Moreover, it is found very difficult to focus this position, except by making small movements of the focusing pinion alternated by small movements to and fro of the whole camera (or of the object by an assistant, which is often easier in such cases; *verb. sap.*).

The next thing that is discovered is that in such a view (such as Fig. 53 (B)) of such a small object as this (a shaving-soap container), using a long-focus lens as above, it is not possible to get the top and the bottom sharp at the same time, even when the diaphragm is down to $f/64$. So one turns to the use of a shorter-focus lens, say one of 8 in., and one finds that the difficulties of getting the object focused to a reasonable size, and also sharp, are not reduced. Nor is the distortion, that is, the disproportion between the size of the top and of the bottom end, which is shown in Fig. 53 (A) to be actually broader than the top. Even then it is found that the smallest stop will still not give sufficient depth,



(a)



(b)



(c)

(d)

FIG. 53. AN APPARENTLY SIMPLE OBJECT WHICH PRESENTS A VARIETY OF PROBLEMS

Showing the Top While Sides are Parallel.

Returning now to the tubular object, we have in Fig. 53 (c) a third variation. This is not put forward as an improvement on either of the two previous examples. Its purpose is merely to show quite a good deal of the top of a small object without in the least throwing the two sides out of parallel. To do this is so very frequently required that the exact position of the camera in making it is worth showing, which

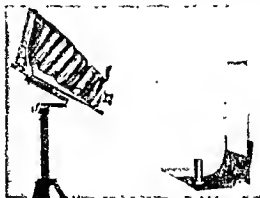


FIG. 54A. CAMERA AS SET FOR 53 (D)

is done in Fig. 54, and shows the use of the drop-front in such cases. The use of a panchromatic plate in Fig. 53 (c) may be considered an improvement by giving more of the real character of the object than the previous examples. By now raising the camera and tilting it downwards, with no further adjustment than slight re-focusing (Fig. 54 (A)), one obtains substantially more of the top view without noticeably throwing the sides out of parallel, a result seen in Fig. 53 (D). The introduction of a red filter brings out the grain of the object to an extent that even coarse half-tone reproduction cannot entirely destroy. It should be noted also that the use of a dark ground has prevented reflection at the sides which might be detrimental if the object were blocked out or the final block cut out. The dark background however, would render the top dark also, so that the raised lettering would be almost invisible. A small sheet of white paper pinned up above the background, and seen in Fig. 54 (A), casts a reflection on the top only (see again Fig. 53 (D))

except by using a swing movement (see Chapter III) to equalize the definition between top and bottom. This movement immediately results in still further exaggerating the disproportion between top and bottom sizes as either a little logical thinking, or a practical trial (or both) will demonstrate and will possibly explain. Therefore, back we go to the long focus lens, making a compromise among the conflicting matters of distortion and definition by first making



FIG. 54. CAMERA AS SET FOR 53 (c)

only a partial swing, then focusing not quite on the very forward detail, finally stopping the lens right down as far as it will go. One finds it necessary to be satisfied with less than a same-size image so as to get as much "depth" as possible, and with enlarging to the required final size afterwards.

From the above it will be realized that the slight departure, even on such a simple object, from a dead straight-on view to one showing some of the top end, has resulted in quite a deal of extra expenditure of time and trouble, and even so the result, as shown in Fig. 53 (B), is not one to boast about. It may be worth noting at this stage that the distortion obtained, as described by using the short-focus lens combined with the swing movement, can sometimes be turned to account, as most faulty methods can, when one needs to introduce a novel and striking effect of an ordinary looking object. Fig. 21 shows such an application of this exaggerated perspective in a subject of somewhat similar character.

Showing the Top While Sides are Parallel.

Returning now to the *tubular object*, we have in Fig. 53 (c) a third variation. This is not put forward as an improvement on either of the two previous examples. Its purpose is merely to show quite a good deal of the top of a small object without in the least throwing the two sides out of parallel. To do this is so very frequently required that the exact position of the camera in making it is worth showing, which

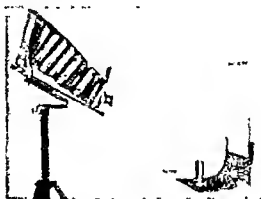


FIG. 54. CAMERA AS SET FOR 53 (D)

is done in Fig. 54, and shows the use of the drop-front in such cases. The use of a panchromatic plate in Fig. 53 (c) may be considered an improvement by giving more of the real character of the object than the previous examples. By now raising the camera and tilting it downwards, with no further adjustment than slight re-focusing (Fig. 54(A)), one obtains substantially more of the top view without noticeably throwing the *sides* out of parallel, a result seen in Fig. 53 (D). The introduction of a red filter brings out the grain of the *object* to an extent that even coarse half tone reproduction cannot entirely destroy. It should be noted also that the use of a dark ground has prevented reflection at the sides which might be detrimental if the object were blocked out or the final block cut out. The dark background however, would render the top dark also, so that the raised lettering would be almost invisible. A small sheet of white paper pinned up above the background, and seen in Fig. 54 (A), casts a reflection on the top only (see again Fig. 53 (D))

and introduces a brilliance that is often extremely useful for polished subjects. A reflection obtained by similar means can be even more effectively employed in Fig. 21, where its absence would have rendered the tops of the coils as black as the slots in them, and the flat top surface of the base would have been as black as its front edge. For more information on the subject of reflections, useful and otherwise, please turn to Chapter XII, under that heading. These comparative examples will suffice to prove that the simplest object can give quite a variety of possible results, and of methods to obtain them.

To Group or Not to Group.

The commercial photographer is often asked to group a number of subjects together in one plate, with the idea of saving money. The idea is to pay for one photograph instead of a block, with only the small extra expense of cutting up the block to separate individual items for printing the catalogue. Sometimes no possible exception can be taken to such a procedure, but the photographer, in his own interests, as well as that of his client, should be cautious in agreeing to the proposition. Several fountain-pens can sometimes be easily photographed in a row as a single one, and so, on the face of it, could several umbrellas or grandfather clocks, since all are long and narrow, and seem to waste a lot of picture space. If the subjects are all of fairly similar character there need be no objection, but if one of the umbrellas has a mother-of-pearl handle, and the next a dark mahogany one, neither will be seen to the best advantage, either together on one print or when separated out, unless the photographer takes as much time in local treatment of negative and print as would represent at least as much cost as making the separate negatives! In the case of the clocks, similar ones can be photographed two on a plate, provided that they have to *face the same way*, and that their individual dials need the same kind of illumination. For instance, a clock with black figures on a gilt dial will need reflected light from a white surface to light up the brass (kept off the case if possible), but the same illumination would not by any means suit a silver dial with pale gold figures. These latter, under such treatment, would be hardly visible against the

whiteness of the dial, and therefore two clocks with these opposite characteristics should not be photographed together. On the other hand, if a pair of the clocks are not to face the same way, plenty of trouble may be looked for in the way of reflections, especially of lamps or windows, in the curved glasses over the dials, because an arrangement of lighting that is right for glasses facing one way will not suit those turned differently, and will require altering drastically before the clocks that have to face the opposite way can be photographed satisfactorily.

In the case of many kinds of objects, such as cups and saucers, or even suit cases, a group photographed in the ordinary way will look perfectly natural, but as soon as an individual outer item is cut away from its neighbours, the perspective immediately appears peculiar and objectionable. The man in the bottom corner of a flashlight dinner photograph is a familiar object of derision enough, but cut him away from his surroundings and he becomes a still more horrible gargoyle. This explains what happens, though, of course, not to the same extreme degree of absurdity, in cutting up some groups of objects to separate their individual components. A further practical objection that can be raised against this fairly frequent proposition is the extra time that will be taken to arrange the subjects satisfactorily. Sometimes this can be estimated in advance and a reasonable charge quoted. Even more strongly can a reasonable objection be raised when the objects are of a nature that will display inter-reflections of one in another, such as many polished ornaments, and the like. The subsequent necessary airbrush retouching in such cases is likely to cost many times more than making separate photographs in the first instance.

In photographing any group of objects, whether for subsequent separating or not, it is advisable to pay much greater attention to the even distribution of light over the group than is required when only a single object is the subject. This is because a detail that receives less light than another one of similar characteristics will have less effective exposure, and will therefore show a markedly different effect in the print, which local shading cannot possibly correct entirely.

Increasing Contrast of Relief.

There are many kinds of subjects in which an exaggerated contrast is practically essential. These are objects which are mainly or wholly of one tone of colour, or in which the different colours are of equal photographic value. Black fire-grate fittings, mouldings, and castings of shadow relief such as golf balls or bars of chocolate or soap are in the first category, and many articles of clothing and materials for the same, which are brilliant to the eye but under 'correct' treatment do not display the design satisfactorily, are in the

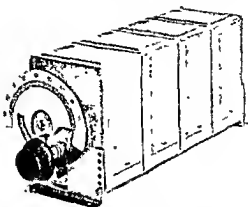


FIG. 53. OBJECT WITH SHALLOW RELIEF AND HAVING NO COLOUR-CONTRAST

Photographed in the "ordinary" way

second. When faced with such articles the photographer must add to his trouble in setting up the subject, selecting his point of view, and suitable manipulation of his camera, some definite treatment in the way of illumination, in order to create the illusion of indentation or relief in the final print. In the case of poor colour-contrast he has other methods to choose from (see page 150).

As regards lighting, he has several definite alternatives. He can place his light more to one side than to the other in lighting shallow reliefs, so that the relief is thrown up by a shadow (see Fig. 59). He can add to this, or use alone, a direct beam, such as that from a spotlight or a naked filament lamp. This method is the most obvious, but it has strong

disadvantages in certain cases. It is not easy to project such a beam edgewise with a flat surface on which are slightly raised details without finding that the end of the object nearest the lamp is much lighter in the print than the far end, and that, what is really very much more important, all the

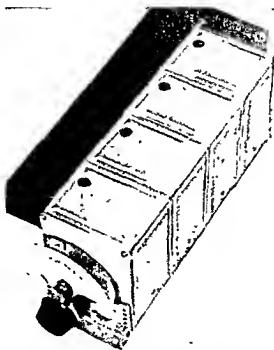


FIG. 56. THE SAME OBJECT AS FIG. 55

Reflections from mirrors behind, and use of swing "movements," produce a more brilliant and interesting view

crudeness and imperfection of the surface is sometimes horribly displayed to a degree almost unbelievable from a cursory inspection of the subject itself. If the subject has a polished surface this is especially true, but it is possible, however, to arrange a continuous reflection from a sheet of white, or at any rate light-coloured, paper all over the surface, when these flaws will, in very many cases, be minimized or even rendered invisible. It depends very largely on the point of view and the attitude of the camera just where

this white reflector is placed. If the "top and front" sort of view is being made, which necessitates the use of a drop-front movement or of a decided downward tilt to the camera, merely placing the article on a sheet of white paper that projects a good way in front of it will be a suitable plan.

If, however, the viewpoint is from one side of the object, the reflector should be a vertical one, placed at the side of the subject farthest from the camera, but on a line running from the far edge of the object towards the camera. The word "reflector" in the sense of these instructions is not that of the portrait-studio reflector, which merely lightens up dark shadows, but is to be regarded as indicating a white area sufficiently large for its actual reflection to be visible over the whole front surface of the polished object being photographed.

In some cases it may be found that the effect of such a reflector is to flatten out just those reliefs which we desire to display along with the flaws which it is desired to obscure! In which case one must either increase the sideways illumination, which will not, in the presence of the reflector, cause the crudity to show so much, or one must turn to other methods, which will be discussed next. When using the reflector as described, due care should be taken that it receives as much light as, or preferably more than, the object itself, and that other surroundings receive very little light. This is especially the case in such subjects as metal, Bakelite, or wooden objects, with embossed lettering or other detail upon them, and, in fact, with almost all articles having indentations of which the sides are straight through such as those which are drilled or chiselled.

When the relief or indentation is only very slight, and its edges are slanting (as in the case of letters on castings and stampings), if the foregoing methods do not sufficiently reproduce the detail, it may sometimes be necessary to employ "adventitious aids" to success. For large surfaces of projecting detail it is often convenient to produce a different texture upon them by gentle dabbing with putty, or even with the paint applied with the finger tip. In most cases ordinary water-colour will be found quite suitable, with the advantage that it is easily removed without trace. On the other hand, for bringing out detail engraved into metal or the like, one can use some black mixture, such as

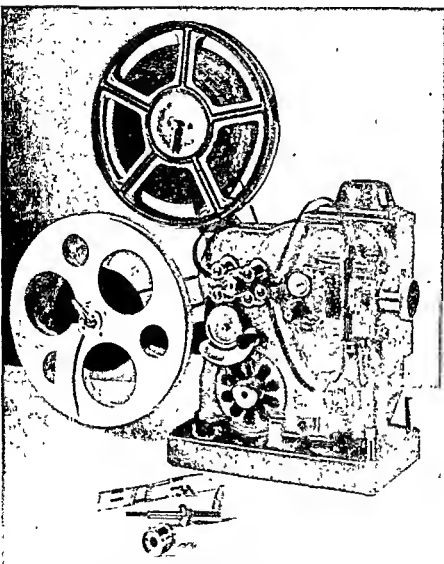


FIG. 57. PHOTOGRAPH OF SIMPLE OBJECTS ILLUSTRATING
CONTRAST INTRODUCED BY USE OF REFLECTION

See pages 144 to 146

shoe-polish, gently rubbing it into the cuts, and cleaning off the outer surface by means of a rag. The latter should be used in the form of a hard pad, to wipe the surface clean, without removing the black from the grooves. With some textured subjects it is surprising what can be effected merely by rubbing over the surface with a warm, moist hand in the way of applying a slight shine to the top surface leaving the sunken parts in their dull state. Combined with an all over reflection, this will be found quite a useful dodge, especially on painted or leather or wooden surfaces. Rubbing with a *dirty* hand, in similar fashion, will result in slight indentations being brought out remarkably, by reason of the dirt lodged in them! Naturally, it is necessary to use a certain amount of discretion in the application of such methods as these. A proceeding that might be highly objectionable and dangerous in the case of a lady's expensive leather hand-bag could be adopted with reasonable care to display the engraving on a presentation watch, and as readily as you like on the brass label of an electricity meter.

Differences of texture, on the same surface, are usually best brought out, when they require exaggeration, by using either an all-over reflection, to produce an effect of shine on the most shiny detail, or by the still more violent method of using a direct source of light itself to produce that shine where it is required. When the article is "straight on" to the camera, naturally the strongest effect will be obtained by placing the lights immediately around the camera. For other directions of view, the lights should be projected (on the billiard-ball principle described under "Reflections," page 166) at the same opposite angle to the surface as the lens is pointing.

When Problems Conflict.

An object will very frequently present a combination of two problems touching on this matter of extra contrast and the methods to be employed. For instance, a book having gold-blocked titling is best treated by a beam from one side to throw up the texture of the cover, but a white reflector will be needed to cast a desirable brilliance over the gilt lettering, which will often look very dull under a direct sideways beam such as might be thought suitable for bringing out relief in embossed details.

On the other hand, a chased silver clock is best treated by the reflection method, because the flat front surface is rendered thereby a clean, smooth white, free from blemishes, leaving the chased lines grey or even black. But the same reflection that so brilliantly lights up the case may have a very adverse effect upon the dial, which is under a glass, and the latter therefore will equally catch the reflection, and give rise to a very hazy appearance on the figures. The same thing applies to similar glazed objects, such as desk calendars, and many others. There are two ways out of this difficulty. The first is to putty the silver case, and photograph it without any white paper around it. This will result in a clear dial, but the silver will not be quite so brilliant as in the previous method unless, perhaps, the negative is intensified locally over that part. The alternative method is to use the reflector method, but to fix a piece of black paper on the reflector of such shape and in such position that the reflection is prevented from acting just where the dial is. Although the proper shape for the black paper is discovered to be anything but a circle, its shape and size are very quickly arrived at if the job is tackled logically. One simply gets an assistant to hold a pencil against the reflector, and to move it gently while one observes the image of the dial on the focusing screen. When the reflection of the pencil is at the top of the dial say "Mark." The same at the bottom of the dial, then at each side. The marks give the dimensions and sufficient indication of the shape of the black paper, which is then cut with scissors, and stuck in place on the reflector.

Process Plates in the Studio.

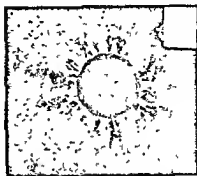
The use of process plates in the studio might appear at first sight to be a contradiction in terms. There are certain subjects, however, for which the employment of an extra contrast emulsion of this kind is invaluable in obtaining a boldly reproducible result that would be almost out of the question otherwise. Almost any object which consists of white or very light material, the features of which are in low relief, is not easy to photograph in the ordinary way with sufficient strength for subsequent half-tone reproduction. By making fairly sharp shadows of the relief, from a direct light suitably placed, and making the exposure on a process

plate, the latter can be developed thinly, so as to retain, or even to emphasize, the differences in tone between the whites and the near-whites, while the shadows can be made to graduate if required into absolutely clear glass, giving definite black lines on the print.

Subjects that have been successfully handled in this way

**FIG 58 INSULATING MATERIALS
TESTED UNDER HIGH-TENSION
CURRENT**

An example of increased colour
contrast obtained partly by the
use of colour separation filters
and of process panchromatic
plates



include: embroidery in white on a white ground, Braille literature (i.e. literature for the blind, consisting only of raised bumps on white paper), mouldings in plaster and porcelain of various commercial kinds, cellophane-packed rice, combs, toilet soap, and artificial teeth!

Increasing Colour-contrast.

Objects which have strongly contrasting colours but which show none when photographed are common. *It does not*

necessarily follow, because it is a colour problem, that colour-sensitive plates must be used! I emphasize this point because I have actually met photographers who, when brought up against a question of colour, immediately think of "pans" as its inseparable counterpart, without any preliminary consideration of what the problem actually is. As a matter of fact one cannot always tell really with any exactitude what colour a manufactured article is, but one has to be satisfied with a common sense, ordinary sort of classification (which may fall down on exceptional occasions by some special peculiarity that does not meet the eye). Who knows, for instance, what can be expected to happen in the case of some purple objects, which may contain more blue or more real red than one thinks. Lots of "greens" are only "greenish" and are totally unlike a primary green, while even ordinary black printer's ink may sometimes photograph lighter than it should, because the printer mixed some blue with it! Blue seems to be a peculiar colour in many ways, even outside photography. It is used to make white linen whiter, and black ink blacker, and who is to know what a dyer may use to make blue look bluer?

Therefore, in handling ordinary photographic colour problems one can only classify colours in a general way, unless they are really of quite decided purity. One does know, however, that to an *ordinary* plate in daylight—

Red	is black	} or, speaking more strictly, they tend that way.
Orange	is black	
Brown	is black	
Yellow	is black	
Green	is black	
Blue	is white	
Violet	is white	

By half-watt light the above tendencies are less strongly marked, and an iso plate *also still further* reduces the evil tendency. Now, if one uses a panchromatic plate, without a filter, the above tendencies are altered, but not removed. They vary with the make of plate, but (with the exception of green, which is reproduced as not quite so black) the tendencies are just reversed to the extent that one can tabulate them as follows.

By daylight, using panchromatics—

Yellow is nearly white

Orange is light grey

Red is light grey

Blue is light grey

Violet is light grey

Brown is dark grey

Green is dark grey

By half-watt light, using panchromatics—

Yellow is white

Orange is nearly white

Red is light grey

Blue is dark grey

Brown is dark grey

Violet is nearly black

Green is nearly black

Then there are the possibilities of correcting and of greatly altering those tendencies by the use of filters. I have avoided previous reference to these for two reasons. The first is that the above ranges are very useful in themselves for much commercial photography, and the second is that often one simply cannot use a correction filter. Quite apart from the sometimes prohibitive length of the exposure itself, some city premises are liable to vibrations, both from within and from without, which rule out lengthy exposures. Some close-ups of small dark objects already require several minutes exposure without a filter.

Supposing, then, we have a design of red details on a blue ground, it is likely that the use of a panchromatic plate, with its proper correction filter, might give us a perfectly even grey result with no pattern on it at all! On the other hand, reference to the above lists will indicate that the use of an "ordinary" plate would make the red detail almost black against an almost white ground where the thing was blue! A panchromatic, on the other hand, used in half-watt light, would do exactly the reverse; it would make the red detail come as very light, against the dark background of the blue. Hence, it is clearly practicable to produce colour contrasts, not only by using pan plates without a filter, but in many cases by avoiding the use of a panchromatic altogether. The latter proceeding is especially useful when the colour is a pale one, upon a white ground, of any of the "black" ones on the ordinary plate list. An exposure a little on the short

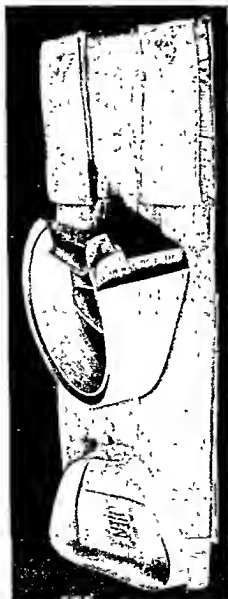


FIG. 50. WITH A MATT-SURFACED SUBJECT WITH NO COLOUR-CONTRAST RELIEF IS OBTAINED BY USING A DIRECT BEAM

side, followed by immersion in a rather concentrated developer, will often result in a very gratifying increase of contrast against the white groundwork. Red letterpress, for example, requires an ordinary, *not* a panchromatic plate, for its satisfactory reproduction.

Memorizing Filter Action.

When considering colour contrasts, I find it a very good rule, in order to prevent mental confusion, to forget for the moment everything about making *negatives*, and to stick entirely to ideas of the final print. It is useful also, for any one who easily gets "mixed up" between colours and tones, to think only of *warm-and-cold* colours, *light-and-dark* in the prints. Those who use "pans" habitually can go one farther, and associate "warm-and-light," and "cold-and-dark," especially if they use the unscreened pan in half-watt illumination. "Warm-and-light" will clearly indicate that "warm colours come out light," while "cold-and-dark" equally signifies that cold colours result in blacks, which is exactly what happens in those circumstances. When the reverse effect is desired, an ordinary plate will do it!

When one wants to go a step farther, and introduce definite colour selection by means of a filter (which can only be done with a panchromatic plate), there is another very simple aid to memory as to what, exactly, any particular filter will do. Instead of trying to remember all the textbook facts about the spectrum, hold the filter you *think right* up to the window, and intone the following cantation: "The tint I see so *bright*, that tint will be white." There is no need to put on a special robe, or to smoke any but your ordinary pipe while saying this, or in fact, to risk the derision of your companions by speaking the words aloud! But it will be clear in a flash that whatever the tint of the filter held up, details of that colour in the subject will be light in the result, and all "*opposite*" colours will be darker. That is if the filters used are those belonging to the ordinary tri-colour set, namely red, green, and blue. Now out of these one really needs only the red and the green, because what the blue one does is usually done at least as well, and certainly quicker and more cheaply, by using a non-pan plate without filter.

It is best to leave all special contrast filters till one has

become familiar with the use of the normal correction filter and the two tri-colour filters just mentioned. Even then, these will be the ones most often turned to for practical use. There is just one point here worth emphasizing, and that is that these filters are of as much service *for the colours they stop, or make dark*, as for those of colours which they lighten. For instance, if one has a label on which some of the wording is in blue, and some in red ink, it should be plain that an ordinary plate will render the red holdly but the blue will be faint, while a pan plate will tend to give the reverse effect, namely, the red will tend to look wasby, although the blue letters will be fairly plain. Now either the red or the blue filter will certainly darken one of the colours, but the words which are the same colour as the filter will disappear entirely into the white background! On the other hand, the *green* filter, although there is nothing on the label which it can "cut out" or lighten, will very definitely *darken* both the red and the blue letters at the same time, which is exactly what is required in such a case.

Subjects in Boxes.

There is a certain definite type of subject in which it is difficult in the extreme to obtain sufficient contrast in the most essential part, while easy to get it in the rest. I refer to boxes with a hinged lid on the top. It does not matter whether it is a fancy box of chocolates, or a "compendium of games," or a box of scientific or surgical instruments, the overbanging lid in every case not only prevents sufficient light getting to the details under it, but what is far more important, it is in the very place where, in nine cases out of ten, the light ought to be coming from. Therefore, not only are the contents of the box in shadow, but no amount of local intensification will help, because the lighting contrast required to "lift" them out of their surroundings is not there. In the case of chocolates, which are semi-matt-surfaced objects almost invariably much darker than the box in which they lie, the only satisfactory way in which they can ever be successfully photographed is by shining on to them from above and *behind* a light considerably more intense than that directed on the box from in front so as to introduce recognizable shadows from the moulded detail. In

natural shadow under the lid without obscuring the important detail. To fix the lid photograph upon the improved interior, two methods can be selected from according to the nature of the individual box. The easiest method, probably, is to make the basic print of the body of the box with the bright contents, and to paste on to it a cut-out print of the lid only. A better plan in most cases will be to make a print which has the satisfactory interior somewhere near the centre

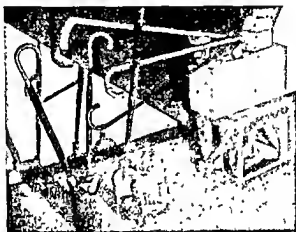


FIG. 61. THIS GIVES SOME IDEA OF THE ARTIFICES EMPLOYED TO ARRANGE THE DESIGN ILLUSTRATED IN FIG. 60

of a somewhat larger sheet of paper, then to cut out the faulty interior from a print which shows the whole exterior perfectly (i.e. from the first negative), which is stuck down over the good interior. When dry, both are trimmed together. This is slightly more trouble, but is also slightly better than pasting the new interior on top of the exterior print. The illusion of correctness is more likely to be there, and any imperfection of register is more easily retouched.

When Things Won't Stand Up.

A good deal of ingenuity is called for, in the case of many small objects, to make them stay or stand in the positions desired. Some round objects will roll away obstinately from the desired spot, even though one has done one's best to level the table on which the articles are being arranged.

the case of surgical instruments, these can only be effectively illuminated by a flat reflection from behind, to whiten the steel and plating, and brighten any polished ebony handles, and to outline the velvet. In either instance, as well as in practically all similar arrangements, successful photography by the ordinary means seems out of the question.

There is just one way out of the difficulty, if the client can be persuaded to permit the extra expense and that is to

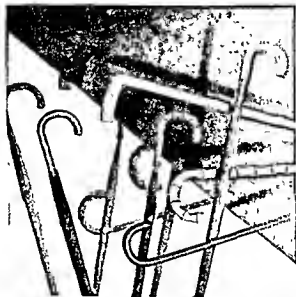


FIG. 60. AN ASSEMBLY OF SIMPLE OBJECTS SUCH AS THESE IS NOT ALWAYS SO EASY AS THE PICTURE MIGHT SUGGEST

make a simple combination job of it. One first takes a photograph in the ordinary way, doing one's best with the exterior only. Then, without moving the box in any way, or at any rate having taken steps to be able to return it to its exact position, the lid is turned back, or removed altogether if possible (for instance, by unscrewing the hinges). The lighting is then arranged to get the contents properly illuminated, and a second exposure made. In printing from this second exposure the back portion should be darkened somewhat by printing up, which method will secure the effect of some

natural shadow under the lid without obscuring the important detail. To fix the lid photograph upon the improved interior, two methods can be selected from according to the nature of the individual box. The easiest method, probably, is to make the basic print of the body of the box with the bright contents, and to paste on to it a cut-out print of the lid only. A better plan in most cases will be to make a print which has the satisfactory interior somewhere near the centre

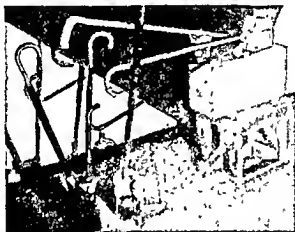


FIG. 61. THIS GIVES SOME IDEA OF THE ARTIFICES EMPLOYED TO ARRANGE THE DESIGN ILLUSTRATED IN FIG. 60

of a somewhat larger sheet of paper, then to cut out the faulty interior from a print which shows the whole exterior perfectly (i.e. from the first negative), which is stuck down over the good interior. When dry, both are trimmed together. This is slightly more trouble, but is also slightly better than pasting the new interior on top of the exterior print. The illusion of correctness is more likely to be there, and any imperfection of register is more easily retouched.

When Things Won't Stand Up.

A good deal of ingenuity is called for, in the case of many small objects, to make them stay or stand in the positions desired. Some round objects will roll away obstinately from the desired spot, even though one has done one's best to level the table on which the articles are being arranged.

the case of surgical instruments, these can only be effectively illuminated by a flat reflection from behind, to whiten the steel and plating, and brighten any polished ebony handles, and to outline the velvet. In either instance, as well as in practically all similar arrangements, successful photography by the ordinary means seems out of the question.

There is just one way out of the difficulty, if the client can be persuaded to permit the extra expense, and that is to



FIG. 60. AN ASSEMBLY OF SIMPLE OBJECTS SUCH AS THESE IS NOT ALWAYS SO EASY AS THE PICTURE MIGHT SUGGEST

make a simple combination job of it. One first takes a photograph in the ordinary way, doing one's best with the exterior only. Then, without moving the box in any way, or at any rate having taken steps to be able to return it to its exact position, the lid is turned back, or removed altogether if possible (for instance, by unscrewing the hinges). The lighting is then arranged to get the contents properly illuminated, and a second exposure made. In printing from this second exposure the back portion should be darkened somewhat by printing up, which method will secure the effect of some

natural shadow under the lid without obscuring the important detail. To fix the lid photograph upon the improved interior, two methods can be selected from according to the nature of the individual box. The easiest method probably, is to make the basic print of the body of the box with the bright contents, and to paste on to it a cut-out print of the lid only. A better plan in most cases will be to make a print which has the satisfactory interior somewhere near the centre



FIG. 61. THIS GIVES SOME IDEA OF THE ARTIFICES EMPLOYED TO ARRANGE THE DESIGN ILLUSTRATED IN FIG. 60

of a somewhat larger sheet of paper, then to cut out the faulty interior from a print which shows the whole exterior perfectly (i.e. from the first negative), which is stuck down over the good interior. When dry, both are trimmed together. This is slightly more trouble, but is also slightly better than pasting the new interior on top of the exterior print. The illusion of correctness is more likely to be there, and any imperfection of register is more easily retouched.

When Things Won't Stand Up.

A good deal of ingenuity is called for, in the case of many small objects, to make them stay or stand in the positions desired. Some round objects will roll away obstinately from the desired spot, even though one has done one's best to level the table on which the articles are being arranged.

When the subject is to be a group of various objects, a lot of valuable time and temper can be expended in this sort of game. There are other things, such as machine parts, that one is called upon to photograph away from their usual supporting surroundings, and which are then top-heavy. In other cases, even though they could be laid flat and photographed from above, it is not desired to have any shadows thrown by the objects on to the table. This may be because of the expense of blocking-out a large number of small objects, or because they are light in tone, and blocking out would represent them as rather pale ghosts against the whiteness of the pure paper; or again, because the extreme fineness of the detail prohibits hand blocking-out.

It is really not practicable to do more than to give a few examples of methods which are generally applicable for supporting awkward objects, since the actual method finally adopted in any individual case must depend entirely not only on the individual difficulty, but often on the readiness and mechanical ingenuity of the operator in devising an easy and quick means of coping with it. Objects which will not stand up, but will lie flat on their backs, are the easiest to deal with if one has an arrangement for photographing them vertically. If not, it is obviously a case of tilting the board on which they are laid (short of the point at which they slide downwards), and of tilting the camera towards the centre of the board. Very slippery objects of metal or bakelite, or similar impervious substances, can be sometimes fixed in position by means of a spot of seccotine, allowing plenty of time for the latter to dry before tilting the board.

Shadowless Photographs.

If it is desired to avoid showing any trace of shadow, there are two methods that can be adopted. One is to support the objects well above the board, and this is only practicable with an horizontal board and with the camera pointing downwards at it (vertically or at an angle, according to the effect desired). Obviously, for this method the means of support must be smaller than the object. Much can be done in this way by the use of ordinary screws driven slightly into the board, which has been first covered with a new sheet of paper of the required tone for a background. The flat top of

a screw affords quite a suitable place on which to balance many a small object of much greater size. Objects of larger size can be supported on three screws, or even on pins or nails driven in and suitably spaced. Cylindrical or globular objects, that tend to roll about so annoyingly, can be supported in a definite position by the use of pairs of crossed pins, or nails (according to the object's size and weight). Each pair of pins is driven in to form an X, the heads can



FIG. 62. ARRANGEMENT FOR "SHADOWLESS"
PHOTOGRAPHY OF SMALL OBJECTS

That permits of changing tint of background without disturbing the subjects

then be cut off, and the object placed upon the resultant tiny trestles, which will raise it definitely above the board, with no chance of rolling. There need not be any visible sign of the pins at all if the "trestles" have been kept narrow, so that the overhead view hides them beneath the object.

An alternative method for abolishing shadows is to place (or to glue if necessary) the objects on a sheet of ground-glass, which latter is supported a few inches away from the background paper (see Fig. 62). If the objects are stuck on, the glass can be tilted, or even raised to the vertical position, but the time allowed for the adhesive to dry cannot be hurried, and obviously heavy objects can only be handled upon a really thick sheet of ground-glass laid horizontally

viewing the result through the camera, to get some idea of how the composition would look when reduced down. You might even go so far as to determine the exact position of the board and camera in case the need for moving the arrangement afterwards might bring your delicately arranged display clattering down. You would certainly realize that the preliminary rough arrangement of the whole display will avoid a lot of unwanted pinholes on the background as well as a lot of wasted time in moving pins here and there as the display requires re-arrangement. You would realize that the group might not be perfect when viewed through the one-eyed stiff-necked camera, which often sees things so differently from a two-eyed head that sways about!

As I remarked above, you yourself, dear reader, would think of all these very simple, elementary, and obvious precautions in advance. But it may well be that you know someone (even possibly among your own staff!) who has that quality of logical foresight not so strongly developed, and who might find some of these apparently childish hints useful. I am bound to confess that many of the methods recommended herein have been evolved as the result of my own mistakes, and that I often blush when recalling some early absurdity. My only excuse can be that there was then no such book as this to guide me!

Lenses for Small Objects.

A short-focus lens is frequently employed for photographing small objects, simply because many close-up subjects require considerable depth of focus, and this is so readily obtainable by using a short-focus lens without unduly stopping down and consequent prolongation of exposure. This practice, however, results so often in severe distortion of perspective, due to the lens coming very close to the subject. It is worth remarking that the particular type of exaggerated perspective referred to is often noticed more by the client, who is familiar with the actual appearance of his goods, than by the photographer! It is far better to use a fairly long-focus lens in order to avoid such distortion, even at the expense of long exposures. It is far better to do what one can to shorten exposures by using plenty of light, and by bringing it nearer to the objects, which latter action has

considerable effect in the desired direction. On the other hand, too long a focus is undesirable, not only because of the difficulty of securing sharp detail throughout the planes of an intricate subject, but also because the absence of "perspective" can be as objectionable as too much of it. The apparent depth from front to back of an object will be diminished by using too long a focal length, much in the same way as is seen in photographs of cricketers which are taken from away back on the pavilion roof. The length of the pitch, in these photographs, appears to be absurdly short, and the bowler and the batsman seem to be of equal height and too near to one another to need the strenuous effort they are seen to be making.

For work on half-plates a lens of about 11 or 12 in. focal length is about right for most objects. When a great deal of top view of an upright subject is required, a lens of 8 in. will be easier to use, but requires caution to avoid an unnatural appearance. There are just a few close-up subjects which call definitely for a still shorter-focus lens. When the subject consists of a "box of gadgets," such as is the case with some scientific instruments, with important details fixed to the inside walls, the usual long-focus lens will only show to advantage those towards the opening, the rest being hidden behind them. A short-focus lens will need a nearer viewpoint, one that will look more inside the box, as it were. Similarly, one may be photographing a subject which is arranged as two sides of a corner, such as is represented by the fittings now in front of me, namely the electric-light meter on one wall and the corresponding switch and fuses on the wall adjoining. A good normal view of the meter would show the rest rather "end-on." If a clear exposition of a subject so arranged were more important than a little undue perspective, I should certainly use a fairly short-focus lens, say, a 6 in. on the half-plate. This would have the effect of apparently "opening out" the two sides of the corner, in other words, there would be a more front-view of each side than could be obtained at a greater distance. Similarly, the inside design of a bowl would usually be far better displayed for reproduction by use of a short-focus lens, because it would "see" the pattern at the side, whereas a long-focus lens would not.

CHAPTER XII

REFLECTIONS

REFLECTIONS, from the point of view of the commercial photographer, are of two distinct varieties. They are either good, or they are bad. Unfortunately, much has been written on the subject of avoiding reflections in subjects to be photographed in such a way as to make it generally assumed that reflections are mostly bad and to be avoided at all costs whenever practicable. Still more unfortunately, some writers have gone so far as to describe elaborate but purely imaginative methods for the avoidance of reflections which in some cases are ludicrously and absurdly impracticable, and which in other cases would not, even if carried out, achieve the desired result.

In this book I want to avoid anything which is not strictly sensible and workable in ordinary practice. Therefore it is necessary to decide in what sort of subjects reflections are not wanted, and those which they improve, and into which they can purposely be introduced. The latter, it may seem strange to say, are as numerous as the former. It is essential also for an operator to understand clearly just how reflections arise, and how to tell just where they come from. In other words, how to apply logical reasoning in each case, in place of guesswork. Then he is in the best position to decide what can be done in the one case to avoid the bad reflections, and to produce the good ones when wanted.

Reflections in Shop-windows.

Shop-fronts provide the most obvious example of not-wanted reflections.

If it were not for the glass, the photography of shop-fronts would be one of the easiest subjects commercial photography knows. The glass acts as a mirror exactly like any other as regards what is reflected in it. In my experience it is seldom that one has had the opportunity of advising the shopowner how to dress his window to minimize the reflections by keeping the contents light and forward to the

glass; usually the dressing is done first, and the photographer is summoned afterwards. Nor has the latter any control over the opposing buildings and the sky above them. He can usually choose the time of day, sometimes can decide whether he will take a straight-on or an angle view. He can decide whether he must work from the near kerb, if the window is not too broad for such a near point, or whether the traffic will allow him to work from the opposite kerb, if he has a lens of sufficiently long focus for the latter distance. (These questions of distances and suitable foci can be decided by trial or by calculation.) It must usually be one or other of the kerbs, unless one stands in the roadway, with an assistant to act as traffic controller.

A Mirror Shows How and Why.

Now a simple experiment with a mirror in the home will show why the far kerb will give less reflections. Standing near to the mirror, closing one eye the while, will show an amount of the opposite wall reflected in the glass of several times its own breadth. As one steps away from the mirror, so the amount of detail reflected is much reduced. Therefore, to reduce reflections get as far from the shop-window as possible. Standing again near to the mirror, it will be noticed that part of the white ceiling is seen. Stand on a chair, and the ceiling disappears. Therefore, if the chosen viewpoint shows the sky behind the camera reflected in the window, raising the camera will show less of the sky in your shop-window. (You will then require to drop the lens, see Fig. 13, *et seq.*) Since light objects quite obviously make stronger reflections than dark ones, it is better to have the objects opposite the window as dark as possible, which is at night! (and please see page 130 for night photography of shop-fronts). Even in the day there is a time when the buildings opposite are darker than at others. That is, when the sun is shining up and down the street, but inclines to the side on which your subject is. The sun directly upon the window would be even better if the shadows of detail in the window itself do not make an objectionable pattern. If the building behind the camera is a new white stone one, or the like, reflections of it will be almost impossible to avoid, except at night. The same refers to a window which is faced by a

side turning opposite. It is in such cases that one seeks for a remedy in an angle view. There need be no guesswork about it. One can usually recognize the precise details that are being reflected by just looking at the window itself from various viewpoints, and one selects the point that promises the least objectionable result. It is very useful, however, to make a little note of the simple truths about how these reflections come and go, so as to be able to apply them to other subjects where the sources undesired of reflections are less obvious.

The "Billiard-ball Principle."

It will very quickly be realized that reflections in a shiny subject arrive and proceed to the lens in a manner very much akin to the flight of a billiard ball against and from the cushion. Just as a billiard ball flies from the cushion at exactly the same angle as it strikes it, so does light from a polished surface (see Fig. 64). Therefore the light from an object which is reflected in the glass of a window leaves that window, or any other polished surface, at precisely the same angle as it reached it. To avoid the camera seeing that reflection the lens must be pointed towards the window at some other angle, or the origin of the reflection must be removed or obscured.

These are also "Shop-windows."

Exactly the same law applies, as I have suggested, to any other polished surface, whether it be the front of a wardrobe or the face of a clock, a varnished oil-painting, or a man wearing eyeglasses. The only difference being that in these examples one can usually move the subjects as well as the camera, and can move or darken the detail reflected, and often one can control the position of lights which may be themselves the origin of bad "reflections."

Panchromatics. When Not to Use a Filter.

It is a fact that the use of a panchromatic plate will reduce reflections in many subjects. Still more, if a correction filter be used. The use of a red or orange filter will still further darken the reflection of blue sky in a shop-window, but should be used with due caution, having regard to the fact

that it will at the same time reproduce any objects in the window that are yellow, red, or orange as pure white, and any others that are green or blue or violet as black! Similarly the "filtered pan" will reduce reflections from french-polished furniture by selecting the light from the red or brown wood beneath, and by "cutting out" the blue and violet rays so predominant in the reflections. In the case of very cheap cabinet work it is sometimes a mistake to use this now very well-known method of "bringing out the grain" merely because such grain often consists of "mahogany" stain very crudely applied in brush strokes on a whitewood basis. In such a case the conscientious photographer only succeeds in exposing the horrible fake only too clearly!

Reflections from a White Background, to Prevent or to Use.

On the other hand, polished furniture is often photographed against a white background, in order to make blocking-out easier, or to save the trouble of doing it altogether. When this is done one should more particularly than ever bear in mind the billiard-ball principle. One is so apt to regard the background merely as a background, and not to notice the very great effect it has on the subject itself. I have met many photographers who suppose that if a subject be photographed first against a white ground, and then (changing nothing but the background to a dark one) if another plate is exposed and subsequently blocked out, the two results will be very much alike. I have known still more who know that there must be a difference, but how vast and astonishing that difference is, and how it comes about, seems to be not so generally realized.

I have, therefore, gone to the trouble of illustrating rather fully this particular point, in Figs. 63 to 67 inclusive. Fig. 63 shows a dark article of furniture photographed in a very usual fashion against a white background. Note how the whiteness of the background is reflected far too strongly in the polished top and side, while the front is much too dark. Fig. 64 explains in diagram form just how this comes about. It will be seen that light reflected in the polished front, from the floor, does not travel in direct lines either from the brightest part of the lamp to the floor, or from the subject through the lens. That is why the front appears dark in



FIG. 63



FIG 63 (A)
REFLECTIONS, GOOD AND BAD

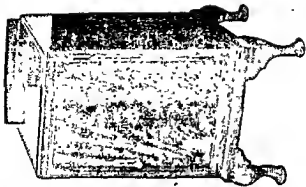


FIG 63 (B)

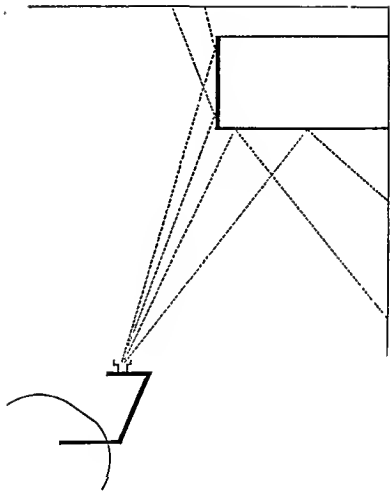
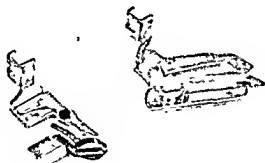
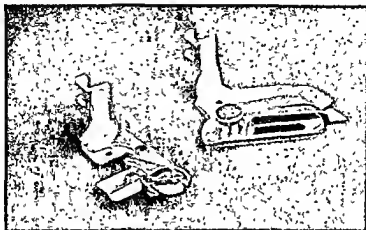


FIG. 64

precisely the same conditions, the only difference being a change of background from dark to light. I put these forward as conclusive proof that the tone of the background



FIGS. 65 AND 66. THE TONE OF THE BACKGROUND MARKEDLY AFFECTS THE RENDERING OF POLISHED OBJECTS

does materially affect the rendering of most subjects, and certainly of all polished ones. Fig. 67 shows how a satisfactory evenness of tone was secured in the above examples by allowing the objects to reflect a background which is continued over and under them.

Several additional facts are worthy of attention in connection with reflections from backgrounds. One is that if the polished surface on which the reflection shows has bumps (i.e. raised parts, either accidental or part of the design on it, these will show up far more strongly if the reflection is allowed to show than if it is prevented from acting by pinning up black paper.

Hence one can definitely control the appearance of the finished result of such bumps. If they form an important



FIG. 67. BY USING A CONTINUOUS BACKGROUND OVER AND UNDER FLAT, POLISHED OBJECTS, A DESIRABLY EVENNESS OF TONE IS PRODUCED

item of the design of the subject, the whiter the part of the background immediately reflecting over them the better. The practical "whiteness" of the background for this purpose is largely dependent upon the amount of light that reaches it. Often it is useful to throw a beam from a spotlight directly upon the background only, with the sole purpose of exaggerating the reflections in the surface of the object, and so increasing the relief of the "bumps" against the whiteness of the surrounding "reflections" (see Fig. 21).

On the other hand, if the "bumps" are faults, and are therefore not desired to show up, the use of a dark background is desirable.

background well away from the subject, or *vice versa*, such foreground reflection from a perfectly even brilliant white surface can be employed as the main illumination of subjects which it suits.

Practical application of these two variants, i.e. of weak indirect, or of strong direct, reflection from a white foreground can be exemplified as follows: In the case of the cabinet (Fig 63 (1)) the white foreground has merely reflected light upward on to the polished front to reinforce the direct light from the lamps. In neither case does the angle of incidence of the light produce a "reflection" in the polished surface of the source, so that there is no "glare" either all over or in

background well away from the subject, or *vice versa*, such foreground reflection from a perfectly even brilliant white surface can be employed as the main illumination of subjects which it suits.

Practical application of these two variants, i.e. of weak indirect, or of strong direct, reflection from a white foreground can be exemplified as follows. In the case of the cabinet (Fig. 63 (A)) the white foreground has merely reflected light upward on to the polished front to reinforce the direct light from the lamps. In neither case does the angle of incidence of the light produce a "reflection" in the polished surface of the source, so that there is no "glare" either all over or in patches.

Now take a lady's hand-bag with a plated clasp on the front, or a small electric fan, a cine-projector, like Fig. 57, or even just one of those little popular ebony elephants. Place it on a table covered with something fairly dark. Train the camera upon the object, from a point somewhat higher up, in just the ordinary way. Now, while looking at the image on the ground-glass, get an assistant to slide a large white card upon the table, between the object and the camera. A simple experiment of that kind will demonstrate far more effectively and usefully the effect of a white foreground for such subjects than any number of descriptive pages I could write. But I might just again refer the reader to Fig. 57, which exemplifies in a remarkable manner the action of a white foreground in imparting brilliance into a polished object. The trouble is that, although a shiny subject is expected to look brilliant, it never does so in a photograph unless the shine is indicated by means of something white reflected in the polished parts. They will just as easily reflect *black* objects, and so appear *black*, unless definite steps are taken to avoid that circumstance.

Just as with white backgrounds, these remarks as to white foregrounds refer mainly to *polished* objects. For matt-surfaced subjects, the greatest relief is obtained from the reverse procedure. This is because matt surfaces do not to such a great extent display "reflections" as such. In them the shadows are lightened by white reflectors, and consequently relief is not necessarily accentuated, but often definitely reduced.

Scratched Surfaces.

Polished surfaces which have been scratched badly will show the scratches much less, or not at all, when an all-over reflection, from white background or foreground, is used. But the same treatment will equally eliminate finely-engraved workmanship.

Reflections from a Mirror.

A movable mirror, as used in the portrait studio, is often of great value in the commercial studio. It can be used just for introducing light into recesses or on to the shadow sides of objects. When using a spotlight beam on to an object for the purpose of using the black shadow as part of the design, it is often useful to use the mirror for illuminating the shadow side of the object only, because it can be adjusted so as to throw light on the required detail without destroying the cast shadow. A matt reflector will not do this.

A mirror is also often useful for introducing a little extra brilliance into a dull-looking subject. (See Figs. 55 and 56.)

Inter-reflections and Putty.

There are some subjects in which reflections occur between its various parts. As I write this I can see the keys of the typewriter reflected in the black metalwork behind them. In most silver and plated ware one can see reflections of the handles, as well as of the feet, reflected in the rounded bodies, in addition, of course, to all the other reflections of the camera and the operating-room. Groups of such objects will show reflected images of one another. That is why many ingenious methods which are often put forward for screening away surroundings are so often useless in the face of inter-reflections between the parts of the subject itself, which such methods can never avoid. The only way to prevent this type of reflection is treatment of the subject itself. Sometimes the air-brush can usefully be requisitioned, either on the subject itself, or, more usually in practice, on the print, but when the silvery look of any "white" metal articles is to be retained, there is nothing to beat the good old-fashioned method of puttying. New putty, very gently dabbed on, and finally smoothed down with a still more gentle wipe with a new piece of soft cotton-wool, will give a delicate matt sort of shine on

background well away from the subject, or *vice versa*, such foreground reflection from a perfectly even brilliant white surface can be employed as the main illumination of subjects which it suits.

Practical application of these two variants, i.e. of weak indirect, or of strong direct, reflection from a white foreground can be exemplified as follows: In the case of the cabinet (Fig. 63 (A)) the white foreground has merely reflected light upward on to the polished front to reinforce the direct light from the lamps. In neither case does the angle of incidence of the light produce a "reflection" in the polished surface of the source, so that there is no "glare" either all over or in patches.

Now take a lady's hand-bag with a plated clasp on the front, or a small electric fan, a cine-projector, like Fig. 57, or even just one of those little popular ebony elephants. Place it on a table covered with something fairly dark. Train the camera upon the object, from a point somewhat higher up, in just the ordinary way. Now, while looking at the image on the ground-glass, get an assistant to slide a large white card upon the table, between the object and the camera. A simple experiment of that kind will demonstrate far more effectively and usefully the effect of a white foreground for such subjects than any number of descriptive pages I could write. But I might just again refer the reader to Fig. 57, which exemplifies in a remarkable manner the action of a white foreground in imparting brilliance into a polished object. The trouble is that, although a shiny subject is expected to look brilliant, it never does so in a photograph unless the shine is indicated by means of something white reflected in the polished parts. They will just as easily reflect *black* objects, and so appear *black*, unless definite steps are taken to avoid that circumstance.

Just as with white backgrounds, these remarks as to white foregrounds refer mainly to *polished* objects. For matt-surfaced subjects, the greatest relief is obtained from the reverse procedure. This is because matt surfaces do not to such a great extent display "reflections" as such. In them the shadows are lightened by white reflectors, and consequently relief is not necessarily accentuated, but often definitely reduced.

Scratched Surfaces.

Polished surfaces which have been scratched badly will show the scratches much less, or not at all, when an all-over reflection, from white background or foreground, is used. But the same treatment will equally eliminate finely-engraved workmanship.

Reflections from a Mirror.

A movable mirror, as used in the portrait studio, is often of great value in the commercial studio. It can be used just for introducing light into recesses or on to the shadow sides of objects. When using a spotlight beam on to an object for the purpose of using the black shadow as part of the design, it is often useful to use the mirror for illuminating the shadow side of the object only, because it can be adjusted so as to throw light on the required detail without destroying the cast shadow. A matt reflector will not do this.

A mirror is also often useful for introducing a little extra brilliance into a dull-looking subject. (See Figs. 55 and 56.)

Inter-reflections and Putty.

There are some subjects in which reflections occur between its various parts. As I write this I can see the keys of the typewriter reflected in the black metalwork behind them. In most silver and plated ware one can see reflections of the handles, as well as of the feet, reflected in the rounded bodies, in addition, of course, to all the other reflections of the camera and the operating-room. Groups of such objects will show reflected images of one another. That is why many ingenious methods which are often put forward for screening away surroundings are so often useless in the face of inter-reflections between the parts of the subject itself, which such methods can never avoid. The only way to prevent this type of reflection is treatment of the subject itself. Sometimes the air-brush can usefully be requisitioned, either on the subject itself, or, more usually in practice, on the print, but when the silvery look of any "white" metal articles is to be retained, there is nothing to beat the good old-fashioned method of puttying. New putty, very gently dabbed on, and finally smoothed down with a still more gentle wipe with a new piece of soft cotton-wool, will give a delicate matt sort of shine on

which reflections will not be sharply defined. When there is some embossed ornament on the silver, usually that part can be left to take care of itself, but the puttying should very carefully be carried right up to its edges, if necessary, by rolling pieces of the putty into pencil and chisel shape so as to follow outlines successfully. This putty method is useful for many other shiny objects which give trouble from inter-reflections. (There is never any need to putty the side of an object which the camera will not see!)

It should not be forgotten that the puttying, or otherwise treating of a polished metal object, does not by any means counteract the reflections of background and other surroundings, but merely diffuses them. Therefore it remains quite important to study the effect of these surroundings and of the lighting used upon the subject. Fortunately its appearance to the eye makes it particularly easy to do so. What seems to be a very prevalent misconception is that it is desirable to remove all reflections when photographing such shiny metalware. This misconception arises from the idea that silver and the like are "white," whereas they only appear as white when they reflect the image of some white surface. To this end one writer goes so far as to describe a box, lined with black velvet, within which to stand such articles, and so to prevent reflections from surroundings. As a matter of fact the only dark object should be the background.

To obtain a silvery appearance is to aim at an *almost continuous* reflection in the metal, but this should be a graduated one or the object will look more like a flat cut-out card than like a rounded shape. Sometimes this graduation can be obtained by the use of a roughly-contrived muslin tunnel, over and around the subject and camera, and wrapped around the latter to avoid the reflection in the polished surface of a black gap right opposite the former. It is seldom worth while trying to construct a permanent muslin tunnel for this kind of work, unless there is a lot of it. It does not obviate puttying (because of inter-reflections), and does not permit of much freedom of action for the camera in dealing with differing sizes of subjects and the like. Sometimes it is desirable to move the muslin gently during the exposure because folds and puckers in the muslin may be reflected as dark marks. Most of these subjects can quite

successfully be handled by making the sources of light the sources at the same time of the desired reflections.

Moving the lights during exposure will often produce some very fascinating graduations in the putted metal surface. In many cases the desired results can be obtained by use of a large white sheet on the table on which the subjects are stood. Here again it is sometimes advantageous to get somebody to "break the edges" of the white sheet in order to graduate them in the reflection. This can be done either by lifting and lowering the margins of the sheet carefully, or by holding up sheets of white paper and sliding them to and fro about those margins. Naturally, if one wants to do this sort of thing it will be advisable to stop down well so as to have time to manage the moving reflections steadily and without jerks. As a variant a white card, or even a mirror held in the hand and moved about, can very often be used to introduce a graduated high-light where none actually exists.

Objects Under Glass.

Polished metal objects in glass-covered cases comprise a class of subjects in which reflections obscure the detail as well as flatten the results, but in which, on the other hand, their total absence is almost equally undesirable. They vary from the big transmitting wireless valves and all sorts of electrical instruments in glass-fronted boxes to objects displayed in showcases. Ordinary illumination upon these often produces reflections over the glass that clash with or kill the principal details, while lighting from behind or from side to prevent these reflections presents the metal objects more or less in darkness or as black silhouettes. A very sound way of overcoming these obstacles is to obscure all lights of large area, and light the subject by the bare filaments of one or more lamps, either removing the reflectors from around them, or placing them at some distance. The idea is to use a lighting source whose own image will reflect from the glass as a dot or two instead of as a spread of reflection, so that it is desirable also to remove or screen any light objects around the place that also may give rise to undesired reflections. At the same time the contained details will be satisfactorily illuminated.

Metal Showcards.

Another instance when reflections are necessarily introduced into a type of subject in which normally they are best avoided, is when copying showcards which have, either as



FIG. 68. GLASSWARE PHOTOGRAPHED WITH LIGHT DIRECTLY FROM BEHIND THE OBJECT THROUGH GROUND-GLASS suitable for a cut-out block.



FIG. 69. THE SAME OBJECT PHOTOGRAPHED WITH A BLACK BACKGROUND AND LIGHTS AS ARRANGED IN FIG. 62, WITH A SMALL STOP IN THE LENS.

their background or as part of their lettering, some metal foil. The latter when treated in the ordinary way of copying, that is to say, under conditions which avoid reflections at all costs, will appear very dead-looking. Aluminium foil will "come out" a miserable grey, and gold will appear darker still. In both these cases a sheet of white paper, with a hole in the centre for the lens to peep through, held in front of

the camera, will brighten the results considerably. When it is the background of the card that is of metal, a graduated reflection often looks better than an even one, and this can be obtained by slanting the paper reflector, or by replacing it by a lamp at one side of the lens, moving the lamp up and down, as well as some way above the lens, during the exposure. Exactly the same principles apply, of course, when a brass name-plate, or similar object, is photographed.

Glassware.

Glassware differs in so many ways that it is not practicable to make specific recommendations; some experiment is desirable for each subject usually. The differences are not only in the shapes but in the character of the moulded or cut design, and in this way these characteristics react upon one another, under differing lighting conditions. Many workers and some clients prefer the method of placing the glassware before a dark ground and throwing the light from a point at either side of the background, that is to say, from behind the article, as in Fig. 62. That is often the best way when the engraved design is pre-eminent in importance, but the effect too often tends to suggest white lines on black ebony rather than cuts on glass. The use of a spotlight, also rather from behind, which duplicates the design in the shadows cast by the articles, gives very attractive results.



FIG. 70. AS FIG. 69, BUT WITH A LARGE STOP, AND A WHITE PAPER STRIP BEHIND THE OBJECT

The choice of a black, white, or grey background will often depend upon whether the photograph is going to be reproduced as it is, because many catalogues are printed from cut-out blocks. These, if the original photograph has been made with the glass in a high key, will look very weak and



FIG. 71. THIS SHOWS THE SHAPE AND POSITION OF THE WHITE PAPER USED TO OBTAIN THE RESULT SHOWN IN FIG. 70

disappointing. The light, clear sparkling effect can often be retained, even when the negative is blocked out, or the block cut out (which amount to the same thing) by introducing a dark edge to the glassware. This is done by using a very small light background, with something of a black nature placed on each side so that it gives a black reflection in the edges of the glass (see Fig. 45 in Chapter VI). This same method is often useful with other subjects of a light character,

such as silverware, plaster casts, china, etc., when they are to be finally cut out, or blocked out in the negatives.

In any case it is usually advisable, when there is much ornament in the glass, to use a large aperture in the lens, so that the detail on the farther side does not clash too definitely when its image is seen through that on the side nearest the camera. In this connection note the difference between Figs. 69 and 70. Exposures will be short in that case, so that it is practicable to use small easily-movable lamps quite near to the objects, and the advantage follows that the often necessary experiments in lighting for each individual subject can be rapidly made.

The accompanying illustrations will exemplify these remarks. Fig. 68 is a cut-glass object photographed upon a ground-glass platform and background arrangement, as in Fig. 62, but the light was projected through the glass from behind. This result could be blocked out, or be used for a cut-out block, quite well.

Fig. 69 shows the object placed against black velvet, and photographed with a small stop in the lens. This petty effect obscures the design. Fig 70 is practically the same arrangement but with the lens fairly open, so as to diffuse the pattern on the further half and with the lights somewhat behind the glass jar. At the same time the whole is made more brilliant by laying a strip of white paper on the velvet behind the article, while using the drop-front movement of the camera to enable it to be seen through the glass.

Fig. 71 shows the actual shape and position of this paper strip, which was obtained in the following manner. A larger piece was laid on the table, and while examining the image on the ground-glass an assistant moved a pencil upon the paper to instructions, whereby a shape was arrived at which gave the maximum of white area, the edges of which were just concealed out of view behind the glass object.



courtesy of the Union Castle Steamship Co., Ltd., and of the Canadian Pacific Railway Co.
 FIG. 72. ON BOARD THE "WINCHESTER CASTLE." By George H. Meux

Arrested motion should be that motion actually arrested (see Fig. 3) to make a really convincing picture; but an arrested motion is often difficult to "hold."

Naturalness Essential.

Naturalness is even more important in an action picture

CHAPTER XIII

ACTION ILLUSTRATIONS

AN action picture is one that shows somebody doing something. That matter-of-fact description covers an enormous range of photographic endeavour, from the ambitious pictures of life on modern Pacific liners (Fig. 72) by Mr G. H. Mewes, reproduced on page 183, to simple illustrations of the kind shown in Figs. 75 to 77, of "how to do" things. They are used for the highest grade of publicity, down to little schoolboy hints on "How Hobbs holds his bat" or "How to make darts from pen-nibs."

Even a photographer, on seeing the first-named pictures for the first time, will think, not "How did he do it?" but "How I would like to be there!" Which is at once the intention of the pictures, and proves how well concealed is the art (and all the artifices) employed to make them.

Deftness of Hand and Quickness of Brain.

It need not be taken for granted that the little close-ups, to be really both effective and explanatory, are necessarily easier to make than the more ambitious kinds of action pictures used by big advertising firms. Each kind of work has its own problems. In some kinds of staged scenes the picture is planned out very carefully in advance, it is equally carefully rehearsed, and both the photographer and the actors know exactly what they are going to do. In other cases the correct natural effects are obtained by carefully avoiding anything in the way of a rehearsal, in order to ensure that the action shall be perfectly spontaneous, and so to prevent the least suggestion of artificiality. This is the better plan when the performer or demonstrator is unused to facing the camera. In the latter case the photographer needs to have all his wits keenly on the alert, first to seize on the essential and photographable points in the course of the action, and next to perform all his complicated series of operations swiftly and accurately, in order to record the spirit of the pose, before his model gets strained. A pose which is to represent an



by courtesy of the Union Castle Steamship Co., Ltd., and of the Canadian Pacific Railway Co.
 FIG. 72. ON BOARD THE "WINCHESTER CASTLE." By George H. Mewer

arrested motion should be that motion actually arrested (see Fig. 3) to make a really convincing picture; but an arrested motion is often difficult to "hold."

Naturalness Essential.

Naturalness is even more important in an action picture

than prettiness. Take, for example, the advertising photograph by Charles Wormald, on page 195.

The lady is instructing her cook to order certain goods that she has seen advertised in her local paper.

This apparently simple action photograph contains several points worthy of special attention. The lady is no chocolate-box model. She is of the very type one would expect to know what she wants, and to see that she gets it. Her whole pose and expression are in perfect natural accord with the idea. The disarray of the table suggests the time, just after breakfast. The cook is just a cook. You cannot see her face, yet you can read its expression just as well by the pose of her back and arms, and the (apparently necessary) insistence of her mistress!

It all looks so simple, ordinary, and natural. "Natural" is the "operative word" in action photographs. Naturalness is the most elusive and difficult ingredient of them all.

Very often it is not only the photographer or his model that gets tired and goes wrong. Suppose one is photographing a series of instructions on the making of a Yorkshire pudding. Everything goes well till one comes to the point when the finished article is to be taken from the oven. The cook is ready to open the oven, and to draw out the baking dish with the appropriate facial ecstasy. The photographer is ready, too, with his slide drawn, and his shutter bulb in his hand. Open the oven, draw out the dish. Oh, dear, the cook's head is shading all the light off that wonderful pudding! Rush round and shift the light. Raise it a bit perhaps? Now the cook is already strained from crouching. Someone opens the kitchen door and lets in a draught. Cook looks up in anger. Down flops the pudding in ditto!

The only way, dear reader, in such circumstances, is to start making a new pudding all over again from the very beginning, and if the cook or you have another appointment I am afraid it will not be kept. The case is still worse if the subject you are illustrating is the making of clothes, and you find that an early one of the series is no good. You cannot, usually, cut up *another* length of cloth to replace a negative. The same applies to the doing of many things, from hairdressing to motor repairs. You will not easily get a mechanic to take down that engine again because the



negative, showing how he removed the old gasket, is not up to the mark. Therefore the photographer has to work not only swiftly but with great accuracy too. In this branch of photography "resits" just are not

In this kind of work the poses are often not easy to "hold" the problems of effective lighting are often serious, especially



FIG. 74. WHEN THE "WORKING POSITION" IS SUCH A RESTFUL ONE AS THIS APPEARS A TIME EXPOSURE CAN BE GIVEN

away from the studio; and so is the matter of compromising between depth of focus and length of practicable exposure, and all the other factors incidental to subjects which ought, by photographic standards, to be treated as very "still life." But because they do actually contain the element of life, they have to be dealt with with a swift concentration only equalled by that of the dentist who allows 40 seconds of

anaesthesia for extracting ten difficult teeth. Such rapid co-ordination of mind and hands cannot be attained merely by experience over a period of years. It is acquired by hard thinking and very determined practice.

The "Story" the Primary Feature.

Yet there is just one thing that the photographer must *not* do. He must not sacrifice an iota of the naturalness of the

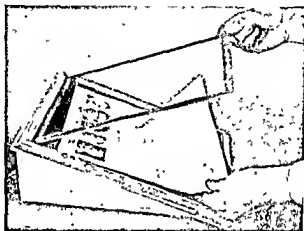


FIG. 75 A POSITION AND AN OBJECT WHICH ARE NOT EASY TO HOLD, IN AN ARRANGEMENT THAT REQUIRES CONSIDERABLE "DEPTH OF FOCUS"

pose in order to obtain the stillness of the human figure, or of the hands in close-ups. It is done, and all too often. I have seen a photograph of a man supposed to be working a machine, who had a finger hooked into it, obviously to keep his hand still. He was as much working that machine as if he had been committing that other crime of grinning into the camera. In both cases the man is saying quite clearly, "I am having my photograph taken." In the one case he likes it; in the other he is obviously feeling uncomfortable. In neither is the reader's mind wholly concentrated on how the machine is being worked, which is the essence and purpose of the illustration. See Fig. 27 for a simple example of an error which *some* will have observed exists, though not every one can explain. The fact is that no one

to bear in mind that, as a general rule, the smaller the object or work being shown the smaller the stop. This because for very "close-ups," without going into scientific explanations, every photographer knows he has much less "depth." Getting close-up, too, introduces difficulties of violent perspective. Both these drawbacks can be greatly reduced by satisfying oneself with an image of rather smaller size, with a view to subsequent enlarging. It still is necessary to use a stop unduly small in proportion to an exposure time that is consistent with stillness, so one compensates for this by bringing the lamps as close down to the subject as one reasonably can, thereby increasing their active value. Even then it becomes possible to use a larger stop than would often be considered necessary for depth, by making a rapid survey of the subject in order to decide which of the various movements of the camera, singly or in combination, can be employed to equalize the focus over essential details. It is in work like this that a swift and handy familiarity with camera movements can be put to very great advantage indeed.

It is clear that every means has now been considered for minimizing the exposure, as well as chanco of movement, which is always greatest when ten fingers are handling small detail and are being photographed often somewhere approaching full size. We have concentrated the light and have lessened the stopping down, first by using a smaller image and next by using "movements." Still one cannot employ, in many such close-up illustrations, anything approaching a "rapid" aperture, and the exposure may be several seconds, during which the slightest twitch of the fingers will be disastrous.

To Keep a Model Still.

One can go farther than to support, where necessary, the model's arms. It is easy for most people to remain perfectly still, even in quite uncomfortable positions, if one shows them, in advance, how to do so by gently filling the lungs with air, till comfortably full, and then by closing the lips and holding the breath. To inhale a big gasp is worse than useless, for the strain of holding it will set up intense quivering at the wrong moment, but holding the breath as described

ever holds a tripod just that way, resting on a table and with both hands underneath!

There can be no objection, of course, to a man's hands being supported in the right position to prevent trembling, provided the means of support are not visible. But the support must be adjusted to the pose, and not the pose to the support. Otherwise, there are never wanting people who will "write in" to one's client, be he an advertiser or an editor, to say that such a thing could not be worked that



FIG. 76 DIFFICULT TO "HOLD," THOUGH A SMALL STOP IS NECESSARY

How to combat the difficulty, even in poor light, is explained in this chapter

way! And, in fact, it very often will be obvious that it could not. There is no reason, for instance, if a screwdriver be difficult to hold still at a certain stage of constructing a wireless set, why that driver should be held in a manner that not even a schoolboy or a housewife would adopt. There may be every reason, though, to stick a spare tripod under the man's elbow, *outside the picture*. On very rare occasions, with unusually difficult subjects and poor light, I have had actually to use strings to keep objects and hands steady, but this has happened only twice or three times, perhaps. Fortunately, there are nearly always better ways than that.

Overcoming Technical Obstacles.

An illustration of the "How to do" type nearly always needs a fair depth of focus, and in this connection one has

to bear in mind that, as a general rule, the smaller the object or work being shown the smaller the stop. This because for very "close-ups," without going into scientific explanations, every photographer knows he has much less "depth." Getting close-up, too, introduces difficulties of violent perspective. Both these drawbacks can be greatly reduced by satisfying oneself with an image of rather smaller size, with a view to subsequent enlarging. It still is necessary to use a stop unduly small in proportion to an exposure time that is consistent with stillness, so one compensates for this by bringing the lamps as close down to the subject as one reasonably can, thereby increasing their active value. Even then it becomes possible to use a larger stop than would often be considered necessary for depth, by making a rapid survey of the subject in order to decide which of the various movements of the camera, singly or in combination, can be employed to equalize the focus over essential details. It is in work like this that a swift and handy familiarity with camera movements can be put to very great advantage indeed.

It is clear that every means has now been considered for minimizing the exposure, as well as chance of movement, which is always greatest when ten fingers are handling small detail and are being photographed often somewhere approaching full size. We have concentrated the light and have lessened the stopping down, first by using a smaller image and next by using "movements." Still one cannot employ, in many such close-up illustrations, anything approaching a "rapid" aperture, and the exposure may be several seconds, during which the slightest twitch of the fingers will be disastrous.

To Keep a Model Still.

One can go farther than to support, where necessary, the model's arms. It is easy for most people to remain perfectly still, even in quite uncomfortable positions, if one shows them, in advance, how to do so by gently filling the lungs with air, till comfortably full, and then by closing the lips and holding the breath. To inhale a big gasp is worse than useless, for the strain of holding it will set up intense quivering at the wrong moment, but holding the breath as described

ever holds a tripod just that way, resting on a table and with both hands underneath!

There can be no objection, of course, to a man's hands being supported in the right position to prevent trembling, provided the means of support are not visible. But the support must be adjusted to the pose, and not the pose to the support. Otherwise, there are never wanting people who will "write in" to one's client, be he an advertiser or an editor, to say that such a thing could not be worked that



FIG. 76. DIFFICULT TO "HOLD," THROUGH A SMALL STOP IS NECESSARY

How to combat the difficulty, even in poor light, is explained in this chapter

way! And, in fact, it very often will be obvious that it could not. There is no reason, for instance, if a screwdriver be difficult to hold still at a certain stage of constructing a wireless set, why that driver should be held in a manner that not even a schoolboy or a housewife would adopt. There may be every reason, though, to stick a spare tripod under the man's elbow, *outside the picture*. On very rare occasions, with unusually difficult subjects and poor light, I have had actually to use strings to keep objects and hands steady, but this has happened only twice or three times, perhaps. Fortunately, there are nearly always better ways than that.

Overcoming Technical Obstacles.

An illustration of the "How to do" type nearly always needs a fair depth of focus, and in this connection one has

to bear in mind that, as a general rule, the smaller the object or work being shown the smaller the stop. This because for very "close-ups," without going into scientific explanations, every photographer knows he has much less "depth." Getting close-up, too, introduces difficulties of violent perspective. Both these drawbacks can be greatly reduced by satisfying oneself with an image of rather smaller size, with a view to subsequent enlarging. It still is necessary to use a stop unduly small in proportion to an exposure time that is consistent with stillness, so one compensates for this by bringing the lamps as close down to the subject as one reasonably can, thereby increasing their active value. Even then it becomes possible to use a larger stop than would often be considered necessary for depth, by making a rapid survey of the subject in order to decide which of the various movements of the camera, singly or in combination, can be employed to equalize the focus over essential details. It is in work like this that a swift and handy familiarity with camera movements can be put to very great advantage indeed.

It is clear that every means has now been considered for minimizing the exposure, as well as chance of movement, which is always greatest when ten fingers are handling small detail and are being photographed often somewhere approaching full size. We have concentrated the light and have lessened the stopping down, first by using a smaller image and next by using "movements." Still one cannot employ, in many such close-up illustrations, anything approaching a "rapid" aperture, and the exposure may be several seconds, during which the slightest twitch of the fingers will be disastrous.

To Keep a Model Still.

One can go farther than to support, where necessary, the model's arms. It is easy for most people to remain perfectly still, even in quite uncomfortable positions, if one shows them, in advance, how to do so by gently filling the lungs with air, till comfortably full, and then by closing the lips and holding the breath. To inhale a big gasp is worse than useless, for the strain of holding it will set up intense quivering at the wrong moment, but holding the breath as described

ever holds a tripod just that way, resting on a table and with both hands underneath!

There can be no objection, of course, to a man's hands being supported in the right position to prevent trembling, provided the means of support are not visible. But the support must be adjusted to the pose, and not the pose to the support. Otherwise, there are never wanting people who will "write in" to one's client, be he an advertiser or an editor, to say that such a thing could not be worked that



FIG. 76. DIFFICULT TO "HOLD," THOUGH A SMALL STOP IS NECESSARY

How to combat the difficulty, even in poor light, is explained in this chapter

way! And, in fact, it very often will be obvious that it could not. There is no reason, for instance, if a screwdriver be difficult to hold still at a certain stage of constructing a wireless set, why that driver should be held in a manner that not even a schoolboy or a housewife would adopt. There may be every reason, though, to stick a spare tripod under the man's elbow, *outside the picture*. On very rare occasions, with unusually difficult subjects and poor light, I have had actually to use strings to keep objects and hands steady, but this has happened only twice or three times, perhaps. Fortunately, there are nearly always better ways than that.

Overcoming Technical Obstacles.

An illustration of the "How to do" type nearly always needs a fair depth of focus, and in this connection one has

above results in a short period of totally suspended animation that is quite splendid for photographic purposes, whereas the normal action of breathing is enough sometimes to move the hands, and the objects they hold, quite badly !

It is not my intention, in describing all these difficulties and how to overcome, or at any rate how to reduce them, to suggest that there are not many such action poses which are perfectly easy and straightforward to photograph, especially if one has the advantage of making them in good summer daylight, or in a studio equipped with a very ample "wattage." The difficult cases, however, are sufficiently numerous and frequent to deserve a good deal of attention.

From "Impossible" Viewpoints.

Here are two examples that very frequently occur in everyday practice, together with suggestions for overcoming the problem in each case. First take the case of an operation, usually carried out flat on the bench or table, over which the worker usually leans in performing the action. The best view both from a pictorial point of view, and from that of the author who wants his readers to be able to follow exactly how the thing is done, is through the worker's chest! Although there seems no alternative to pointing the camera over the worker's shoulder, which is neither convenient nor always effective, there are two or three ways of making such close-up illustrations, showing the hands in perfectly correct positions, without restricting the photographer to a single difficult viewpoint.

One way that is sometimes suitable is to have the operations carried out on a board somewhat tilted towards the camera, and to get the worker to sit on a low stool. One then has a clear view for one's lens. At the moment of exposure the model is asked to bend his head well away, in order to forestall his natural inclination to lean towards his job and so obscure the lens. Another way, applicable more especially when the operation requires the hands to be well apart, is to secure two people, whose hands do not differ too markedly, and to use the right hand of one and the left hand of the other, placing the camera between the two of them! A third method, which I have found extremely useful at times, is to arrange the work-table so that the model sits sideways

If that woman can make a cake like that, I'll bet I could! Here goes" (or whatever happens to be the temporary feminine alternative to "here goes").

That, of course, is the ideal to aim at. The action-photo-graph arousing action on sight! Otherwise, what is the purpose of portraying *action*? It is never easy to explain how to use what is called *imagination*, which is the principal ingredient required in making a picture look "interesting." It is not every commercial photographer who possesses that quality, and those who do have it in so many varying



FIG. 77B

Actually performing the rubbing produces ripples in the powder. A panchromatic plate lightens the hand.

degrees, but I will endeavour to show in a very simple and elementary way the difference in handling a subject from a straight "instructional" photograph to one that will not readily be passed over by the reader.

We have the very simple instructions: "Aluminium can be matted by rubbing with valve-grinding Carborundum." (*Dry-mounting enthusiasts may care to note this.*) Photographer A proceeds to illustrate this very ordinary-sounding process by laying the sheet of metal on the table, sprinkling some of the powder on it, standing the tin up somewhere around, and getting somebody to pretend he is going to carry out the rubbing, which he is told is best done with the open hand (see Fig. 77A). Photographer B realizes that it is

amount of stopping down required. The breath-holding instruction, described previously, is often a further important precaution. All these elements, individually slight, go a long way when used in combination towards securing a well-exposed, well-defined, negative, under the most provocative circumstances

Introducing "Interest."

Making sure that the attitudes are correct, and that the photographic technique is well handled to record the poses



FIG. 77A. MATTING A METAL SHEET WITH CARBORUNDUM POWDER

"Straight" photograph. The powder hardly shows. Dirty hands on an "ordinary" plate look dirtier still

without movement, is still not always enough! That standard may be good enough for little brochures which accompany tools and the like, and purport to show how they are to be used and fixed. For use in publicity, and for illustrating periodicals that depend largely on the attractiveness of their illustrations, one needs to install something more, even into the very simplest notions, to attract and to hold the reader's interest. It is not sufficient, in a popular magazine, that readers who are fond of cake-making should look at the pictures of cakes, in case there may be something that looks worth trying. It is rather that the casual reader should be arrested by a picture, and should say, "What a nice cake.

a small half-tone; so he uses the tin and its shadow to break up the smoothness of the matted part of the sheet, adding to the illusion of perspective or "standing-outness" of the result. A little foreshortening, and the still more exaggerated effect of this caused by the hard lighting on the wrist, help to produce a "live" photograph with just a touch of "out-of-the-ordinariness" that is sure to catch the eye.

Not Too Much "Cleverness."

In seeking to introduce that elusive feature of novelty and eye-catchingness, whether in action photography or in still-life, it is of paramount importance to avoid making the "cleverness" of the effect stronger than the message of the picture. Such added treatment should actually help to "tell the story" better, rather than to compete with it. The idea has been used over and over again of making some rows of objects and their shadows form a sort of pretty pattern. This can be very attractive, but when it becomes difficult even to recognize what the objects are, as sometimes happens, the whole value of the design is lost. Few people will trouble to solve the puzzle, and the interest of those who do will be expended on the "cleverness" of the picture to the exclusion of interest in the subject itself. Similarly, it may be quite amusing if the photograph of a pair of hands knitting happens to present the illusion of a huge butterfly; but the writer on knitting does not want his readers to turn their minds to butterflies nor to curiosities of photography; which have each their own special niches in the scheme of things.

the fact that the power is to be rubbed over the metal that is the essential feature, and as the powder is very much the same colour as the sheet, he proceeds to try whether the rubbing movement will not produce a reasonably visible effect. He also knows that an "ordinary" plate, as used by A, is liable to make a man's hand look very dirty and coarse, especially that of a mechanic, and that a panchromatic will lighten it in contrast, against the grey of the metal, as well as bringing out the name of the material on the coloured tin, the lid of which he has decided to leave off, to suggest that



FIG. 77c

"beating" the pattern, harder lighting, and foreshortening, produce more "popular" appeal

the powder seen has just been taken from it. This, it is plain, is a decided improvement on A's work which shows no "interest" at all. Photographer C realizes that the illustration is not for a manufacturer's instruction leaflet for which B's print would be excellent, or for a technical textbook such as this, but for a periodical of a more "popular" appeal. He makes the rotary movement of the powder at once a little more obvious and "pretty," and uses a hard lighting to throw the pattern in bold relief, at the same time letting it show the roughness of the metal being worked on, contrasted with a smooth finished part. He realizes, too, that the name of the material is not important, since it is stated in the caption, and in any case it is too small to show up in

a small half-tone; so he uses the tin and its shadow to break up the smoothness of the matted part of the sheet, adding to the illusion of perspective or "standing-outness" of the result. A little foreshortening, and the still more exaggerated effect of this caused by the hard lighting on the wrist, help to produce a "live" photograph with just a touch of "out-of-the-ordinariness" that is sure to catch the eye.

Not Too Much "Cleverness."

In seeking to introduce that elusive feature of novelty and eye-catchiness, whether in action photography or in still-life, it is of paramount importance to avoid making the "cleverness" of the effect stronger than the message of the picture. Such added treatment should actually help to "tell the story" better, rather than to compete with it. The idea has been used over and over again of making some rows of objects and their shadows form a sort of pretty pattern. This can be very attractive, but when it becomes difficult even to recognize what the objects are, as sometimes happens, the whole value of the design is lost. Few people will trouble to solve the puzzle, and the interest of those who do will be expended on the "cleverness" of the picture to the exclusion of interest in the subject itself. Similarly, it may be quite amusing if the photograph of a pair of hands knitting happens to present the illusion of a huge butterfly; but the writer on knitting does not want his readers to turn their minds to butterflies nor to curiosities of photography; which have each their own special niches in the scheme of things.

CHAPTER XIV

LEGAL PHOTOGRAPHY

The facts, the whole facts, and (to a degree not often thought possible) nothing but the facts

THE services of a photographer are frequently called in to aid in proving a case at law, both for various civil disputes as well as for purposes of prosecution or defence in criminal cases. The reasons for using photographs in such cases are twofold. Photographs can often present the facts in a simple and direct way that is easily grasped. They can replace or assist long detailed descriptions in the course of which essential features (without the illustrations) might be not fully understood or even might be forgotten by those to whom the facts are being described. The second reason for using photographs is that they can often prove the undoubted truth of the facts, sometimes even obviously and unquestionably.

It should be noted that I used the word "can." The photographer who is required to make such photographs should know positively how to make his results display the essential facts as clearly and obviously as possible to the same end that counsel uses his command of the English language. Just as a famous counsel (Sir Edward Carson) is reported to have announced to a judge that he was "prepared to argue on either side," so can a competent photographer, without in the least departing from strict truth, assist the case of whichever side employs him, as I intend to show. I must at once emphasize that by this I mean simply that he should understand clearly the facts he is required to portray, and should thereupon select the methods best calculated clearly to portray those facts. Mechanically to point his camera at the subject may easily result in a flat-looking jumble of minute detail, most of which has no bearing whatever on the case; with the result that the photograph involves almost as much explanation as if it did not exist. Such unintelligent, automatic photography may frequently prove entirely misleading, and consequently may

he actually not only adverse to the particular side by whom the photographer is employed, but to the cause of justice itself!

Before going into definite examples, it may be interesting to contrast the attitudes of the solicitors in two individual cases (among many such) of "motor smash" disputes. When the photographs which I made in one such case were sent to the solicitors on the other side for their acceptance, the latter firm promptly invited me to make a second set of views for their side of the same case! On another occasion I was taken to an obviously nasty corner by the solicitor, and was curtly ordered to take photographs of the road from certain stated viewpoints. It was perfectly obvious to me that there must have been a collision, and that the purpose of the photographs was to indicate that one or other of the parties had approached the corner wrongly, but when I ventured to inquire which of them my client was acting for, I was met with the counter-question as to "What the blazes is that to you?"

In the latter case the solicitor evidently thought that a camera had no more latitude of expression than a foot-rule, and that, therefore, the man behind it was not required to use any intelligence, or exert any influence on its behaviour. In the former instance, it had been appreciated that I had succeeded in placing the arguments of the one side clearly on paper, and consequently I might be able and willing (clearly I could have no personal bias) to deal equally well with any other aspects of the case. It should be noted here that it is a very frequent practice for photographs obtained by one side to be "accepted" by the other side before the case is heard. This avoids the expense of having the photographer attend at court to "prove" the photographs, and possibly to stand cross-examination as to their authenticity.

"Control," not Untruth.

Therefore it should be clearly understood that to present the facts clearly by photographs does not at all mean that any untruth is to be introduced, even if it could be. But not to know the facts, or not to possess the technical ability to put those facts clearly on bromide paper, may often result in photographs which are entirely useless as evidence, or

may even help to disprove the case they have been made to assist. For instance, a case involved some train lines that stood up above the metalled road. One photograph taken on a dull, grey day, from between and above the rails did not afford any useful evidence at all regarding the rails, except that they existed, which was not in dispute—but the photograph might have been useful in convicting the road-sweeper of neglect of duty. Another photograph by a second photographer, taken at night with a light at one side of the road and the camera at the other, showed shadows of the rails that left no doubt as to whether they projected above the road or not. The fact that they did so simply thrust itself on the attention of anyone glancing at the print, without further question or argument, and there was absolutely nothing else in the print to let the attention wander from that fact.

That example, of course, is a very simple one, and would seem too obvious and elementary to quote were it not that I want to show how mistaken not only is the very prevalent idea of photographer as robot, but also that "straight-forward technique," without knowledge and imagination to guide it, may be quite misleading.

When Measurements are Required.

In some cases it is essential that the particular points of view specified by the client be strictly adhered to, even to the extent of measuring accurately the position of the camera from various points in the scene. In such cases it may be useful to mark the desired position first, and to ensure the accuracy of the viewpoint by means of a weight suspended on a string from the lens, adjusting the camera so that the weight hangs immediately over the prescribed point. When such extreme accuracy is not required, but the view is to represent, say, "what the motor-driver could (or could not) see," it is a very good plan to measure first from the kerb the estimated distance at which a driver would probably sit, and then the height above the road where his eye would be, so as to place the lens there. For in some circumstances it is obvious that the view as seen by the driver of a motor-cycle would be very different from that commanded by the elevated vantage point of a big lorry.

When a series of such photographs is to be made, it is best to make notes of any such measurements and of each aspect as each exposure is made. Otherwise there is liable to be some doubt or confusion among many details if the matter is left till the list of exposures is complete; still more if one's memory is relied on till the prints are made.

Record of Details.

In any case, the time of day and the date should be accurately recorded, even if the point seems to have no bearing on an event which took place, as is frequently the case, many months before the photographs were ordered. I have found on more than one occasion that brief details of facts, attached to or typed on the backs of prints, have not only been regarded as helpful, but have conveyed an impression of reliability that has facilitated the "acceptance" of the photographs by the other side. Such acceptance is not only regarded as advantageous by solicitors on both sides, but must certainly be considered so by the photographer. Even if the latter succeeds in obtaining a special fee as "expert witness," he may be required to spend a considerable amount of time, first waiting (perhaps for several days) till his particular case is called and then till his own evidence is taken, with possible cross-examination to follow. Such time spent in the courts is very rarely remunerative, and often extremely tedious, so that it is to the photographer's own advantage if he succeeds in portraying the facts so clearly that there remains no need for any questions to be asked by counsel on either side.

It may be that I have been unusually fortunate in that respect, but it is a fact that among all the cases for which I have made photographs it has been only in criminal prosecutions that my testimony in court has ever been required. In such prosecutions the acceptance of evidence without formal "proof" in court is not permitted.

Pure Photography Only.

The exact methods that should be employed to make the message of a legal photograph clear must necessarily vary with each individual type of subject, just as they do in the case of other types of subject as described in other chapters.

In fact, there is no difference at all between illustrating a subject for legal purposes and for any other, except that for the former only "pure" photography can be used and that there must be no retouching or "faking" of any sort. The whole purpose of commercial photography is to convey facts convincingly to the public at large, of legal photography to do the same to a very critical thirteen (judge and jury).

How "Movements" Help.

I have found that the "movements" of an ordinary field camera can be of considerable advantage in making photographs for legal purposes, because they allow of selection of view, and sometimes of selective focusing, to the end of concentrating attention on the essential matter. For instance, in a road scene it may be advantageous to emphasize the clearness of the view to the extreme distance, but the ordinarily small aperture necessary would prevent one including on the same negative any of the existing traffic, simply because the long exposure involved in the employment of a small stop would only register a passing car as a vague smear. On the other hand, the inclusion of such traffic might help the "case" by showing clearly how much, or how little, space it leaves for passing on the road and so it will convey whether speed might have been safe or vicious at the particular spot concerned. In order to register sharply the whole length of road from the camera to extreme distance, and still to make an exposure short enough to register some of the traffic reasonably well even in dull weather, the alternative to stopping down the lens is to swing it forward over the road. To do this requires careful handling, if the open aperture of a rapid lens is to be used, but it cannot be done at all with a reflex or press camera. Still less is it practicable with the latter kinds to include a wide-angle of view which will show the details (such as warning signs) at the kerbside near to the camera. That is why I consider the field camera preferable for this kind of work.

Comparison with Straight "Snap."

Another way in which the movements of the stand-camera can be used to make the results more clearly explanatory is

exemplified by comparison with an ordinary hand-camera snapshot of a road. If the hand-camera has been held at eye level, the print will consist, as regards over a third of its area, of sky and tops of trees or buildings. If tilted downwards, so as to include less of this and more road, any buildings, lamp or telegraph posts, or other upright features, will appear as though leaning over, and produce a quite untruthful and unreal appearance. By using a stand-camera and lowering the lens-panel, as described on pages 35 and 36, it immediately becomes practicable to include quite a deal more of the roadway immediately in front of the camera, excluding much of the totally uninteresting sky, and without making the uprights appear in any but their natural attitude. There is no reason why this method of concentrating the important matter within the picture-space, to the exclusion of irrelevant matter, should not be combined with the previously mentioned plan of using the swing-front for obtaining sharp detail from near to far on the road as well as including some items of traffic, if required.

The Scene as Seen.

Definite knowledgeable control of the camera, in the ways suggested, not only results in a picture in which attention is attracted to the salient facts, but in one which is actually much more in accord, in the case of a motor accident photograph, with the view that a driver actually sees through his windscreen than a straight hand-camera snapshot. The only part of the picture that may suffer in definition, when the camera "movements" are used as described, is upper detail of the nearest trees or buildings. That is a part in which sharp definition does not matter at all in that sort of case, and in this respect also the visual effect is certainly more like the scene as a driver observes it.

Things Happen on the Floor.

Very much the same idea holds good in many interior subjects photographed for legal purposes. In any room the scene of human activity (and consequently the cause of legal action) lies (barring the exception that proves the rule) *in its lower half*. Therefore I shall be safe in saying that in

Lighting and Colour do Matter.

The use of lighting can have great influence upon the mental message conveyed by a legal photograph. One example, that of shadows cast by raised tram-lines, has already been mentioned. Cracks in the ceiling, just previously touched upon, are another case in which the essential detail may be indefinite if the photography is faulty. When *it is some portion of a machine that is the point of discussion*, the use of local brilliance, and of selective focusing, are methods of concentrating attention that should be obvious to the photographer. There is all the difference in the world between a flat, ordinary, commercial photograph of a machine, and one in which, say, "the lever that hit the girl" stands out clearly from its surroundings.

The differences between colour-sensitive and other plates can often be employed to advantage in producing photographic representations of evidence. If, for instance, photographs are ordered for the purpose of illustrating the damage that had been done on a parquet floor by dragging objects over it, the evidence might possibly be required in proceeding against the furniture removers for the damage, or, possibly again, for showing that the body, with iron-heeled shoes on, had been dragged across the floor in a certain direction. In either case the photographic problem would be the same, namely to portray the scratches clearly. Procedure usually regarded as producing the most perfect rendering of a subject, namely the use of panchromatic plates behind a filter, would display most beautifully the grain of the wood in the parquet, which the judge and jury would doubtless immediately compare, perhaps enviously, with that in their own homes. The so important scratches, however, would be conspicuous by their absence, or at their best by their feebleness, in the photograph. A good old-fashioned "*special rapid*" plate, however, would show the scratches as bold white lines against an intense black floor, especially if trouble were taken to choose an angle at which the light "caught" the scratches themselves.

A "Pan" Plate and a Good Defence.

In technical contrast with the above it might be useful to quote an actual case where photographs were produced by

the defence in order to prove that there certainly had been a prominent display of statutory notices. In this particular case these were in gold lettering upon a dark ground. At the doorway from which the photographs had to be taken (that being the only place from which the whole interior could be included), the angle of illumination was such as not to illuminate the gold really brilliantly. An "ordinary" plate would undoubtedly reproduce the lettering as black as the board on which it was painted, in other words, they would be invisible, or nearly so, on the photograph. A panchromatic, on the other hand, properly sensitive to yellow, made the gold lettering show as perfectly and clearly legible on the photograph as they were in actuality. Here, then, is another example where proper use of photographic technique, as contrasted with blind, semi-automatic camera work, has scored in evidence. If the photographer, not knowing the purpose of the photographs, had merely made an ordinary interior photograph on an "ordinary" plate, the resulting evidence might have gone a long way to secure an adverse verdict where none such was deserved.

These examples are not in the least intended to suggest that photographs are not perfectly good evidence, but merely that in incompetent hands they may be faulty evidence, in the same way that a verbal description of facts by an unobservant and inaccurate person may be. The photographer who is entrusted with legal work, therefore, should use all his knowledge and skill to make his results perfectly reliable in every respect, and should be able to substantiate the accuracy and reliability of his evidence, if need be under cross-examination, not forgetting that the latter may take place several months after making the photographs.

especially as the latter needs no cloth to ensure freedom from light leakage, even in the most brilliant sunshine. These slides are still obtainable at second-hand shops sometimes.

A fairly rapid lens naturally is indicated, even though in fine weather its full aperture will not always be required. Whatever lens is chosen, it should certainly be one of fairly long focus in proportion to the plate, say a 12-in. lens for use on half-plates, for there is nothing more objectionable in an animal photograph than distortion due to too near a viewpoint. Things that are excusable, and in fact generally unnoticed, in a newspaper photograph taken with a press camera, will often horrify the owner of the animal by its exaggerations, or by its display of faults that he would never admit his beasts possess.

Backgrounds a Problem.

The animal photographer must take very careful heed of his backgrounds, although he, no more than the photographer in more usual commercial fields, cannot always command good ones. In the photograph of a famous white shorthorn bull, by G. S. McCann (Fig. 80), undoubtedly a dark background would have been better, but on a show-ground in flat country it is not possible to find a fresh background for each beast. This untouched photograph shows that even a white animal photographed against the sky can prove a technical success if exposure and development are right. Certainly there is no reason for halation in such cases, given a good lens and plates suited to the job.

Backgrounds.

There is nothing that distracts the eye from the distinctive features of an animal more than an ugly or patchy background. While it has been admitted that a photographer cannot always choose his backgrounds, and often needs to resort to subsequent painting-out and airbrushing and the like, yet one cannot help noticing many cases in which the advantage of a helpful background has been present, but the most has not been made of it. Undoubtedly the best background of all, when it exists, is a piece of rising ground, that slopes gradually up behind the animal. Next to that comes a clump of bushes, but there must be a considerable



Fig. 11. S. McCann

FIG. 80. PHOTOGRAPH OF SHOUTHOBY BULL.

This photograph of a celebrated pedigree bull represents practically the ideal type for this type of subject.

space between subject and such a background as this, and still more if buildings form the only available background. In this connection I would like to emphasize the benefit to be gained from using panchromatic material for photographing animals. Quite apart from the improved rendering of any colouring the subject itself may possess, the panchromatic has a beneficial effect as regards the background. It is true that in the case of open landscape the distance is rendered hazier and lighter with the colour-blind "special rapid" type of plate, but when the background is comparatively near, as in the cases just described, their greenness is very apt to make them "come out" very dark, and shiny edges of leaves, etc., white. The consequence is that however much care is taken to keep the background out of focus, as compared with keen sharpness on the subject, the effect of distant softness is absent. The panchromatic will reproduce the green of grass, etc., much lighter than any other kind of emulsion, and it is not liable to the spotty effect referred to. The result is that the background is "thrown back" appreciably. Even red-brick buildings, if out of focus, sometimes do not look too bad when a panchromatic plate is used.

Long-focus Lens.

The choice of lens has a considerable bearing upon the question of backgrounds, in more ways than one. The average lens fitted to a reflex camera (e.g. a 6-in. lens for quarter-plates, or 8½-in. for a half-plate camera) has an angle of view that is not only rather risky to use for close-ups of animals, on account of "distortion," but it includes rather wide range of background behind the subject. In open country the latter condition does not matter, but in many circumstances there are limits to the area of suitable backgrounds available, and these may be bounded by ugly objects that one would like to exclude. A long-focus lens, on the other hand, is a little more difficult to focus with, but in every other way has advantages. The narrow angle not only represents an animal better, but the area of background required is less, and also is rendered more distinct, which is all to the good. There is still another benefit to be gained from using a long-focus lens. As the camera is taken farther from the subject the effect of it

certain definite conventions which are already well established, and are calculated to exhibit the "points" which the breeder aims at. Knowledge of these is the principal stock-in-trade of the animal photographer.

If the pictures are for post-card publication, no such rules hold good. In fact, there are no rules, except the vague one that results must be "attractive."

Animals should never be forced into a pose. Usually it is useless to attempt any sort of posing that cannot be obtained by the gentlest of coaxing, sometimes needing endless patience. Attempts to induce liveliness should be studiously avoided, until one is ready for exposure. Then, and only then, should means be adopted to secure alertness of eye and ear, the method varying according to the kind of animal, and sometimes according to the individual. Shaking a sieve of oats will make most horses prick their ears sharply, unless they have just fed. I have met some though, who would not wink an eyelash if a sheet of galvanized iron were crashed a yard in front of them. In obstinate cases of that kind one can sometimes have a smart young animal of the opposite sex led quietly across the field of vision or even that of hearing. That rarely fails to awaken interest, however transient. (The last two words are intended as a photographic hint, for the animal photographer must needs be ready on the trigger).

"Fat stock" is usually led literally by the nose, but in no other kind of animal (excepting, of course, horses shown actually being ridden or driven) does it seem desirable that the means of control, if any, should be obvious in the picture.

A well-known photographer of pigeons has described a special cage which he had built, in which the only available perch was so situated that the bird could not possibly avoid being at once in focus and broadside-on to the camera. A warmed cushion is said to be useful as an "anchor" for a restless cat, but in my experience it is hopeless to attempt to force a pet to rest upon any sort of platform if he objects. Far better to let him become friendly upon the floor, and to keep the camera correspondingly low. If a dog or a cat has been trained to keep off the table at home, he will do the same in the studio. The photographer must be satisfied to forego personal comfort, and must stoop to conquer.

CHAPTER XVI

COPYING

COPYING by means of the camera can be taken to mean the photographing of any *flat* subjects, whether they be other photographic prints, line-drawings, pages of letterpress, paintings in oil- or water-colours, or patterns of dress-material or of wall-papers.

Square-on, and no Reflections.

All of these subjects, as well as all others of similar characteristics, require the same exact "square-on" position of the camera and lens in order that the results should also be rectangular, and sharply defined all over. The same arrangement of lighting that will reproduce a glossy or a semi-matt bromide print free from "reflections" will do the same for any other shiny original, whether it be painting or a framed and glazed testimonial. At the same time it will allow one to copy a crayon sketch on rough paper without showing the grain of the latter in the result, and it is just as good for those subjects which do not exhibit these "difficulties."

Therefore the ideal conditions for copying every kind of flat original can be established, once and for all, by first constructing an arrangement for keeping the camera square with the subject at all distances (so as to deal with differing sizes both of original and of copy negative), and next by determining the right position for the lights. Both these matters will be given the attention their importance deserves when I have explained certain other considerations.

When a Copy is Not a "Copy."

There are occasions when an oil-painting or other original is too large for the copying installation, or has to be done away from one's premises. In such a case the correct relative positions of camera and light are similar, but are arrived at by extemporized methods (which will also be explained). The *principle* is always the same, but the job takes longer. Therefore the difference is a financial, but not

a technical one. On the other hand, there are cases when one is required to photograph a showcard at an angle, so as to show the strut, or a cut-out showing relief, or again, an open book lying slanting on a desk; while sometimes the texture of a material is required to be illustrated rather than its design. In all such cases there must be some definite departure from the standard copying conditions, which involves individual technical treatment as regards lighting and the like. Such subjects no longer come under the category of "copies," and rarely can be dealt with on the copying

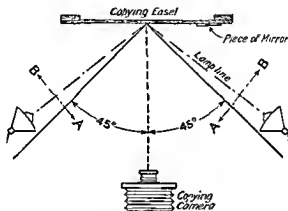


FIG. 81. DETERMINING THE POSITIONS FOR LAMPS IN A COPYING INSTALLATION

bench. Therefore, again, if there is any reduced price for "copies," as against "objects," these special cases should be both treated, and charged for, as "objects."

Ensuring Square Working.

To construct a copying bench is a fairly simple matter. It consists of an "easel," i.e. a flat board on which originals are pinned up, and a pair of rails at right angles to it on which the camera runs to and fro. The camera, though, should not lie directly upon the rails, because the lens must be approximately opposite the centre of the original, and that circumstance would prohibit reproducing an original any larger than the camera itself. A travelling platform is therefore necessary, which will raise the level of the lens

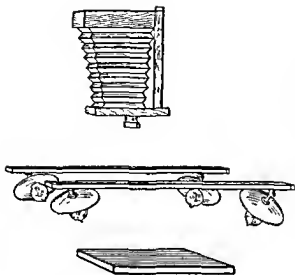


FIG. 83. SIDE VIEW OF ARRANGEMENT SHOWN IN FIG. 82

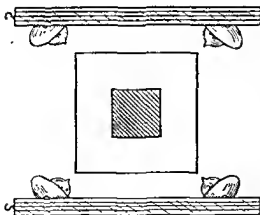


FIG. 82. TILTING LAMPS TOWARDS THE CENTRE OF EASEL GREATLY IMPROVES EVENNESS OF ILLUMINATION

opposite to the centre of the board. When a fair amount of copying is handled, it is very advantageous to keep a square-bellows camera always in position, adjusted squarely with the easel, and with the reversing back truly plumb. Even then it will be found advisable to check the squareness of the adjustments from time to time. It may surprise any one who has never so checked his copying outfit before to notice how very much out of truth it can get by reason of continuous usage. The mere act of inserting and removing dark-slides will gradually but definitely alter the adjustments of a camera in the course of a few weeks, and give rise to a puzzling lack of definition down one side of a set of negatives. Not many photographers will want to install apparatus of the cost and imposing sturdiness of a process camera in order to avoid the chance of such troubles occurring.

Placing the Lights.

Having arranged that the camera shall slide truly to and from the centre of the easel, there remains the problem of correct illumination, which is by no means a difficult one if tackled logically. Taking a line directly through the camera to the easel (see Fig. 81), each of the right angles thus formed is halved. It is a very good plan to do this actually by means of strings attached to a pin which is driven into the exact centre of the easel. The string at each side will be at an angle of 45° to the easel, and the lamps must be hung just on the *easel side* of these strings. Referring to the illustration again (Fig. 81), it should be emphasized that the lamps are to be placed rather towards *B* than towards *A*. The effect of too much towards *B* will be that the ends of the board receive too much illumination as compared with the centre. On the 45° line, or on the *A* side of it, the lights immediately show a tendency to be reflected in glossy originals and produce familiar ugly markings in the results. Therefore the "lamp-line," just on the *B* side of the 45° lines, should be rather carefully established, and then marked on the ceiling, or on the floor. The conditions under which this operation needs the greatest care and precision are when one wishes to make the installation deal with an occasional original of large size while keeping the calibre of the lamps, as well as of the actual space occupied by the outfit, within moderate bounds.

By keeping lamps of moderate power near to the easel, average small work is done with quite short exposures. It would be quite easy, of course, to have lights that would move farther away for covering larger originals, but the act of moving them would upset all the standards upon which the infallible exposure system (described later) is based. A little extra trouble taken to establish such standards at the start saves an infinite amount of time and material later when dealing with a variety of rush work. Just how far away along the "lamp-line" the lights are actually fixed is determined by the following method. One first decides the largest size of original that one is likely to have to handle as an ordinary copying job. This size is marked on the easel. Then the camera is focused up to include that space, using a lens that takes the camera up to the far end of the rails. The lens is then removed from the camera, so is the ground-glass, and one looks right through the empty camera at the easel. An assistant meanwhile holds a small mirror flat against the easel (see again Fig. 81) just inside the size marked. No image of a lamp should show in the mirror. If it does so, that lamp must be carried along the "lamp-line" farther outwards until no reflection of it is visible in the mirror when observing the easel through the camera.

Trouble-prevention.

At the same time it is advisable to note whether there are any other sources of either direct or reflected light that can be seen in the mirror. In such case this might give rise to unwanted reflections in the subjects to be copied, and which therefore should be screened or removed. A whitened wall is a frequent cause of degraded copies in this way.

Equalizing the Illumination.

The lamps on either side of the installation should be equal in strength, and should be fixed at the same distance from the easel, to ensure equality of illumination, which means trouble-free printing from copy-negatives. It is a mistake, however, to rely on one large lamp on either side. It is far better to use two or more lamps of smaller candle-power spaced apart on each side, in preference to one large one, because they will spread the light more evenly, and also

remove the tendency that single lamps have of showing the grain of a rough-surfaced original. These smaller lamps are easy to arrange on battens, and it is still further advantageous to use the type of "batten-holder" that is angled so as to throw the circles of light towards the centre of the easel, as shown in Figs. 82 and 83. The illumination will then be still more even and the whole volume of it will be on the easel, as shown in Fig. 84, instead of only the latter receiving only a quarter of each lamp's circle of illumination. These illustrations should explain clearly the great difference in efficiency

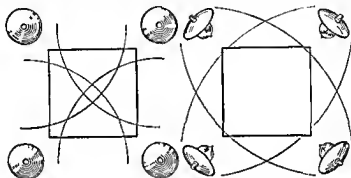


FIG. 84. DIAGRAMMATIC VIEW SHOWING OVERLAPPING CIRCLES OF LIGHT FROM LAMPS STRAIGHT ON, AND TILTED TOWARDS CENTRE OF COPYING EASEL

that results from this apparently slight adjustment. Not only will the illumination be more even, but exposures will be shorter, which is advantageous in copying work.

Genuinely Worth the Trouble.

If the foregoing instructions have appeared to err on the side of being "finicky" in the way of recommending some approach to specific method, there will be no doubt about the advantages as soon as a properly arranged installation is put into use. The outstanding advantages of care in placing the lamps are twofold. First, one is able to copy any kind of original, of whatever sort of surface, without the slightest sign of the "reflections" which have been both annoying and puzzling, and which will be the case even if the surface is covered with a non-reflecting material, or because it is already in use, because its color is not uniform for a sheet of

glass to flatten it for copying. The second advantage is that, the positions of the lamps being fixed, exposures can very definitely be standardized.

Various Originals and Their Treatment.

Originals themselves are of several kinds, each kind requiring special treatment, either in the way of choice of material or of exposure and development. Black and white line drawings, and similar matter, should be copied on "process" plates. These are very "slow," but at the same time there is not a great margin of latitude on either side of correct exposure. Correct exposure followed by thorough development (four minutes at 65° F in the "neat" stock solution, see page 87, with the addition of 1 drop per oz. of 10 per cent potass bromide solution) will result in a negative that is practically opaque, with perfectly clear-glass detail upon it. From such a negative it is the easiest thing in the world to make a print on almost any paper showing no trace of veil, and on which the lines consist of a blackness that is actually purer and deeper than most other "blacks" found in commercial productions. Certainly the letters should be a deeper black than most printer's ink or black water-colour.

On the other hand, for copying photographs and similar "tone" matter, there is nothing to beat the average rapid studio plate, taking the precaution to develop the negative rather longer than for a portrait. All that has been written recommending slow plates notwithstanding, a print from a copy negative properly made on a fast studio plate will be a closer reproduction of the original photograph. If the original, however, had a painted-out background, it will be necessary to block out the copy negative also, because the faint grey that results is very objectionable, and seems to degrade the whole effect. It is better to work this way than to aim at a copy negative that will print pure whites, simply because the attainment of these involves losing also several of the near-white tones in the subject. On the other hand, if the original print contains some whites of the splashy spotlight order, these can be retained, either by matt-varnishing the back of the negative and stumping over these high-lights, or more easily still, by giving the final prints a touch of hypo-ferricyanide reducer to clear them.

touches entirely, but if the copy were made on a rapid studio plate to retain the gentler gradations of tone, some difficulty would be experienced in attempting to reproduce the whiteness of the paper on which the sketch had been drawn.

To reproduce such an original, therefore, some departure must be made from standard procedure, and appropriate precautions adopted. The latter, in such a case, would certainly include particular observation to see that illumination over the original was even. Supposing, for instance, that the lamps on either side of the copying easel had begun to age, or one of them had been replaced in an emergency by another of different wattage or type, the arrival of such a hybrid original might well be made the occasion to correct the matter. The effect of quite a small amount of unevenness in the lighting will be to make the reproduction of the white paper greyer in some parts than in others, and some of the lines will also vary in strength, or even in width, in the final result, which are equal in the original! In a bad

Coloured prints, paintings in oil- or water-colours, and the like, are copied most satisfactorily as regards correct colour values as well as correct gradation by means of *fast* panchromatic plates with a correcting filter. (Ilford H.W., Kodak X2, when copying by half-watt lighting)

Coloured line originals should be copied on process panchromatics, which are much slower than the fast variety, but faster than the colour-blind process variety, with a filter as above, when it is required to reproduce the various parts in their correct colour-values, *but*, and it is a very big *but* if the matter is somewhat pale in tint, and it is desirable to have it stronger in the print, as, for instance, a letter typewritten in the average weak violet, there are some very simple ways of strengthening the tone of such detail, even to the extent of getting it quite black in the print, instead of grey. It depends entirely upon the actual colour which it is desired to deepen what one does about it. If the lines are blue, or violet, the process panchromatic plate is employed, along with a *red* filter on the lens, multiplying the exposure by the factor appropriate to that particular filter when used in half-watt lighting. It may be preferable to print the resulting negative on a contrast grade of paper. If, however, the colour that one desires to deepen is green, brown, or red, or inclines in any of those directions, there is no need to use a panchromatic or a filter at all. These colours are just those to which the ordinary slow process-plate is colour-blind, and which can therefore be regarded as practically synonymous with black. When a plate of that kind is used, the consequent result will be clear, or fairly clear, lines on the process negative. For more detailed information on the subject of colour-contrasts see page 150.

“Half-breed” Originals.

Then there are originals which partake of the nature of more than one of the above four rough classifications at the same time. In such cases it is usually necessary to make some sort of compromise between the methods appropriate to each. For instance, it is very often the case that a bold drawing in black crayon will have some details drawn in grey pencil or even in delicate wash. Treating the drawing as a line job on a process plate would lose such delicate

touches entirely, but if the copy were made on a rapid studio plate to retain the gentler gradations of tone, some difficulty would be experienced in attempting to reproduce the whiteness of the paper on which the sketch had been drawn.

To reproduce such an original, therefore, some departure must be made from standard procedure, and appropriate precautions adopted. The latter, in such a case, would certainly include particular observation to see that illumination over the original was even. Supposing, for instance, that the lamps on either side of the copying easel had begun to age, or one of them had been replaced in an emergency by another of different wattage or type, the arrival of such a hybrid original might well be made the occasion to correct the matter. The effect of quite a small amount of unevenness in the lighting will be to make the reproduction of the white paper greyer in some parts than in others, and some of the lines will also vary in strength, or even in width, in the final result, which are equal in the original! In a bad case of uneven illumination, in copying the type of original under discussion, one part of the copy would show good black crayon lines on white paper, while another part will represent the pencil lines as equally black on a dirty-looking ground. Another wise precaution is to use for such subjects only perfectly fresh material. An old process plate, that might reproduce a bold line original perfectly well if kept within a half-inch from the edges, might not be fit to reproduce faint and delicate detail.

One has the choice, in the line-plus-delicate-tone sort of original, of two alternatives. The first is to use a process plate, exposed as for line, but developed as for tone (i.e. with dilute solution short of opacity). The second is to use a rapid plate also exposed as for line (a *line* subject requires *one-fourth* of the exposure of that for copying a *full-tone* bromide print) but developed with a concentrated plus-bromide solution. The first is the best when the delicate detail is in pencil on pure white paper; the second, if the paper is tinted, and if the weak detail is in wash.

It may be found necessary in printing from the negative to make tentative tests to determine whether the best reproduction will result from a normal paper with strong restrained developer rather than to try to retain a pure white

Coloured prints, paintings in oil- or water-colours, and the like, are copied most satisfactorily as regards correct colour-values as well as correct gradation by means of *fast* panchromatic plates with a correcting filter. (Ilford H.W., Kodak X2, when copying by half-watt lighting.)

Coloured line originals should be copied on process panchromatics, which are much slower than the fast variety, but faster than the colour-blind process variety, with a filter as above, when it is required to reproduce the various parts in their correct colour-values, *but*, and it is a very big but, if the matter is somewhat pale in tint, and it is desirable to have it stronger in the print, as, for instance, a letter typewritten in the average weak violet, there are some very simple ways of strengthening the tone of such detail, even to the extent of getting it quite black in the print, instead of grey. It depends entirely upon the actual colour which it is desired to deepen what one does about it. If the lines are blue, or violet, the process panchromatic plate is employed, along with a *red* filter on the lens, multiplying the exposure by the factor appropriate to that particular filter when used in half-watt lighting. It may be preferable to print the resulting negative on a contrast grade of paper. If, however, the colour that one desires to deepen is green, brown, or red, or inclines in any of those directions, there is no need to use a panchromatic or a filter at all. These colours are just those to which the ordinary slow process-plate is colour-blind, and which can therefore be regarded as practically synonymous with black. When a plate of that kind is used, the consequent result will be clear, or fairly clear, lines on the process negative. For more detailed information on the subject of colour-contrasts see page 150.

"Half-breed" Originals.

Then there are originals which partake of the nature of more than one of the above four rough classifications at the same time. In such cases it is usually necessary to make some sort of compromise between the methods appropriate to each. For instance, it is very often the case that a bold drawing in black crayon will have some details drawn in grey pencil or even in delicate wash. Treating the drawing as a line job on a process plate would lose such delicate

touches entirely, but if the copy were made on a rapid studio plate to retain the gentler gradations of tone, some difficulty would be experienced in attempting to reproduce the whiteness of the paper on which the sketch had been drawn.

To reproduce such an original, therefore, some departure must be made from standard procedure, and appropriate precautions adopted. The latter, in such a case, would certainly include particular observation to see that illumination over the original was even. Supposing, for instance, that the lamps on either side of the copying easel had begun to age, or one of them had been replaced in an emergency by another of different wattage or type, the arrival of such a hybrid original might well be made the occasion to correct the matter. The effect of quite a small amount of unevenness in the lighting will be to make the reproduction of the white paper greyer in some parts than in others, and some of the lines will also vary in strength, or even in width, in the final result, which are equal in the original! In a bad case of uneven illumination, in copying the type of original under discussion, one part of the copy would show good black crayon lines on white paper, while another part will represent the pencil lines as equally black on a dirty-looking ground. Another wise precaution is to use for such subjects only perfectly fresh material. An old process plate, that might reproduce a bold line original perfectly well if kept within a half-inch from the edges, might not be fit to reproduce faint and delicate detail.

One has the choice, in the line-plus-delicate-tone sort of original, of two alternatives. The first is to use a process plate, exposed as for line, but developed as for tone (i.e. with dilute solution short of opacity). The second is to use a rapid plate also exposed as for line (a line subject requires *one-fourth* of the exposure of that for copying a *full-tone* bromide print) but developed with a concentrated plus-bromide solution. The first is the best when the delicate detail is in pencil on pure white paper; the second, if the paper is tinted, and if the weak detail is in wash.

It may be found necessary in printing from the negative to make tentative tests to determine whether the best reproduction will result from a normal paper with strong restrained developer rather than to try to retain a pure white

background by using a contrast paper. The latter usually tends to coarsen the crayon work or any grey wash on the original. Usually it is better to ignore a faint tint of the background when printing and to remove it cautiously from the print with a weak reducer.

Then there is the bolder line-plus-tone original consisting of a tone subject surrounded by black and white letterpress. This is actually more difficult than the foregoing to reproduce satisfactorily. If there is plenty of space between the two parts, a negative can be made, going all out for the tone portion, but developing a little deaser than usual. Then the line matter can be slightly reduced on the negative, and in printing can be printed up strongly, again removing the tint from the background by local reduction of the print. This will give a correct reproduction of the tone original, and with care the lettering can be shown as in good black on pure paper. When the black type is too close to the tone subject for this, absolutely correct photography will sometimes give a reasonably good reproduction of the whole, but if a perfect result is aimed at only a combination job will give it. That is to say, two entirely different negatives must be made, one on a process plate for the line, and one on a soft plate for the tone portion of the original. One can then choose between double-printing in register, as would be best if a number of copies are wanted, and the alternative method, for only one or two copies, of making clean, bright prints for the letterpress on contrast paper, and mounting upon them, over the now hopelessly dark tone portions, cut out prints from the negative made specially to reproduce them properly.

Stained and Yellowed Originals.

Amongst the photographs from various sources which come in to the commercial photographer for copying, there will be some that have deteriorated by yellowing, or even by showing brown patches, sure signs of incomplete fixation when made. One need not, nowadays, speak too scathingly of such phenomena, even though the causes of the deterioration are far more well known than formerly. It is a feature of commercial photographic life that the time allowed from the placing of an order to delivery of the finished work is very often less than twenty years ago was regarded as

essential for merely fixing and washing the prints! Small wonder if, among the hundreds of thousands of photographs so rushed through, some of them ago too soon. It must often be the natural result of an over-hecktic youth!

Then there is the kind of print which has actually *faded*. It is necessary to draw a firm distinction. The former kind has a normal grey image, but the paper, or the gelatine, is stained. In the latter kind, the paper is pale yellow, and the imago is a pale yellowish-brown, faded from its original strength. In the case of brown *stain* one wants the horrible thing to vanish, but to leave the image as it is. In the case of *fading*, one wants that light brown to be stronger, because *it is the image*. I have gone to the trouble of emphasizing this point because I have noticed a tendency (especially in the case of people to whom these matters are not everyday routine) for people to think like this about copying: "Brown stain, yes, pan plate. Another brown photo, yes, pan plate."

The problem, and consequently the appropriate treatment, is entirely different in each instance. The stained print should be copied on to a panchromatic, through a tri-colour red filter. This will very often produce a perfect negative showing no sign of the stain. If the latter is of a very deep brown, and it is proposed to try chemical means of removal, it is strongly advisable to make such a negative first, for there is always a very big risk in treating prints or negatives of unknown chemical history.

In the case of the *faded* print, however, we have an imago which is itself weak. The colour, though a yellowish brown, is one of those, like the yellow of daffodils and of brass, which is *black* to the ordinary colour-blind plate! The paper ground, true, is of a very similar colour, but is sufficiently weaker to afford a contrast, especially if the copy be made on an ordinary *slow process* plate. Quite recently I copied some tiny wartime snapshots of which the image was only just visible as faint yellow, and made enlargements from the process negatives which were almost as good as though from the original negatives. Exactly the same applies to the faded albumen *carte-de-visite*. The latter is often covered with fine cracks, but these are not anything to do with the colour of the image. They can only be regarded as a problem of *illumination*, and with a lighting system like that described

applied if a possibility of dampness exists in the print, and only a moderate degree of heat is safe when dealing with work of unknown origin.

Cleaning Prints Before Copying.

Cleaning originals sent for copying, though often affording marked improvement, must not be undertaken in too care free a spirit. In any case, in handling unmounted prints a towel or blotting-paper is best for laying them upon, so as to soak up the dirt-laden water or other solvent, instead of permitting it to run underneath and soil the paper base. This can very easily occur, and the resulting marks are usually immovable. Water, applied carefully with a bit of clean cotton-wool, will clean most photographic prints satisfactorily, but will remove along with the dirt any spotting or other retouching that may have been done, so that it is well to look carefully first.

The best way to apply water is to wipe over gently first with a wet wad without any trace of pressure. This will have the effect of loosening the dirt without smearing it or damaging the possibly delicate surface. The second or third rub may receive more firmness to remove the softened and now loose matter. Benzine, petrol, or methylated spirit are safer as regards prints which have been worked up, but here again a warning is necessary. Prints upon collodion surface paper can be irretrievably ruined by a touch of spirit, since the emulsion is instantly dissolved thereby.

Treating Unfamiliar Types of Original.

There have been so many kinds of photographic paper in use that prints made before the modern universality of gelatine should always be cautiously approached. A print upon albumenized paper is often covered with a network of fine cracks, almost invisible till the cleaning process fills them with dirt solution. After that they show only too well. Half-stale bread-crumbs is a safe dirt eraser, if used with ordinary caution, for many surfaces. Even a poster or show-card printed with greasy lithographic inks is not always proof against applications of water, for sometimes a newly printed one will be found to "run" slightly, probably by

reason of an aniline constituent of one of the coloured inks. In the case of such printed originals damping the back, to remove creases, and subsequent cleaning carefully with bread-crumbs will be found best. Engravings and other "prints" sometimes are to be copied for illustrating books or lantern-slides. Beyond dusting with a camel-hair brush, no other cleaning should be attempted without sanction of the owner, and not then by one unfamiliar with their idiosyncrasies.

Even illumination, and "filtered" panchromatic plates, will produce copy negatives of a quality quite astounding to those accustomed to happy-go-lucky, makeshift methods. Especially from "toned" prints, and those upon semi-glossy surfaces, the improvement obtained will be well worth while. When worked systematically there is no more trouble involved in the use of colour-sensitive plates than any other kind.

Standardizing Factors.

Any system of estimating exposures for copying should involve not only a standard amount of artificial light, but also a fixed position of the lamps, so as to have at least one factor, namely the strength of light upon the original, reasonably constant. Originals should be classified into about five grades from very pale to very dark, each grade requiring double the exposure of the next lighter, with "normal" in the middle of the series. If copying is done by juniors (as it well can be when the system under discussion is properly installed) a set of comparative originals could be collected and mounted for reference.

The only other components of the system used in the writer's system comprise a yard rule and a tabulated list of exposures. The system consists mainly in the automatic reading of the stop value employed, without any of the usual calculations dependent upon the differing extension. There is only one thing to learn, that is, to start with a lens at its "name-stop." This is an aperture (approximate) of 1 in. diameter. Thus the "name-stop" of an "11-in." lens is $f/11$. The "name-stop" of an "8-in." lens is $f/8$, and so on. *At any given camera extension the exposure with any lens at its name-stop will be identical.* It is rarely necessary, in copying,

to use any other than the "name-stop," but if one stops down from that one place, the exposure is obviously doubled, and so on.

The First Test Plate the Only "Waster."

To commence the system a normal original is pinned up, the standard lights are switched on, the copy focused to equal size, and the lens set to its "name stop." A test plate is then exposed in steps, to determine once and for all the right exposure under those conditions. A blank table is made out in the manner shown below. The correct exposure found is written in the column for the plate used and type of original, opposite the stop value. The stop value is easily discovered. One simply measures the camera extension from the ground-glass to the lens, and the nearest f number to the number of inches is the stop value! For instance, if the camera extension is found to be about 16 in. the "value" or "real stop number" of the "name-stop" is $f/16$. That is sufficiently exact, whatever lens one happens to be using.

Having found by test the correct exposure for each kind of plate used, it is a matter of a few minutes to fill in the times in their appropriate places in the table. The rest of the places in each column are also filled in by the very elementary process of multiplying by two for each place down, and

COPYING EXPOSURE TABLE

Stop Value as measured on 3ft. rule	Ordinary		Process		Pan		Proc Pan	
	Line	Tone	Line	Tone	Line	Tone	Line	Tone
$f/8$			5			1		Seconds
$f/11$			10			2		"
$f/16$			20			4		"
$f/22$			40			8		"
$f/32$			80			16		"
$f/45$			160			32		"

Tabulated copying exposures for differing extensions and plates. See above

dividing by two for each space up, as in any other branch of photography.

The method of using the system is this—

1. Focus up the copy.
2. Set the lens at its "name-stop," and read the real stop value on the yard-stick.
3. Refer to stop value on table and read off exposure in column of plate used.

Once the idea is grasped the ease and accuracy of working are quite astonishing. The exposures, as printed in the example, are about right for a total illumination on the copy-board of 600 watts, and in most cases a line original requires a fourth of the exposure of an average normal tone copy on the same emulsion.

Simplified Copying Exposure Table.

Where originals to be copied do not offer great variety in their character, or as regards the proportion between them and the required results, it is practicable to work accurately with a still more simplified exposure table. This can be based to the best advantage usually upon a test exposure for same-size copies. Copies to half-size will require half that standard exposure. The success of this absurdly simple method of tabulation depends upon using always the same brand of plate and the same lens which is stopped down to the same mark for every copy. In those circumstances it provides a very reliable guide within the narrow limits stated. It is certainly the case that half-size and same-size negatives (with a little latitude on either side that can easily be allowed for when making the exposure) will fill the bill in many establishments, especially if the enlarging and reducing lantern be employed to project negatives to other proportions that may be required. Such a table would scarcely need pinning up for reference in the copying-room, for it would read somewhat as follows—

Copying exposures—

Same size	.	.	.	20 seconds
Half "	.	.	.	10 "

Subject Scale for Exposure.

Just as in estimating exposures for any other branch of work, the "correct" exposure (as obtained from meter, table, or by instinct) is varied according to whether the subject

is "sea-and-sky" or "heavy near foreground," so in copying must one adjust the normal exposure for originals which depart markedly from a "normal" one. It is a very good plan indeed to base all copying exposure tables (except that for pure line originals) upon that for a really good bromide print which is of the type described as right for reproduction in Chapter IX, and to have an additional table of factors, which usually may be only a mental one, for departures from type. For instance—

Rather dark print . . .	half-as-much-again
Very dark print . . .	double the time
Rather light print . . .	two thirds
Very light print . . .	half the time.

The same thing applies to work away from the studio, and most of all to work in a picture-gallery, where originals will vary from a buried-in-brown Old Master, which may need up to eight times the exposure for a "normal" subject (especially in dull winter weather) to a delicate tempera or pastel drawing, which in extreme cases may need only an eighth of the normal. In that particular branch of copying work it will be seen from the above that one subject may need as much as sixty-four times the exposure of the next, *under the same conditions!*

Copying Half-tone "Pulls."

It sometimes happens that one is asked to reproduce from existing half-tone illustrations or the like. For instance, in printing a catalogue one of the items may not be available for making a new photograph, and nothing can be found but a pull from a previous edition. Or it may be an illustration from a foreign or an out-of-print publication that is to be copied, either for a new half-tone block to be made or for lantern-slide purposes. In either case the dots of the half-tone screen are objectionable. In the case of a lantern-slide, which is projected to many diameters, the dot pattern will be seen on the screen in very exaggerated form. On the other hand, when a new half-tone block is produced from an existing pull, it frequently happens that the screen-patterns of the new and the old blocks combine to produce either a watered-silk or a herring-bone effect here and there in odd patches, and sometimes all over.

Obviously, it is advantageous for both purposes if one can remove the dots from the illustration in the process of copying. Even if it is intended to work up the copy before making a new block, the artist will have far less work to do if the screen-grain has been removed, or at least minimized. The best way to do this is to make the copy negative of a smaller size than the copy is required. Having focused up the image, the latter is then thrown out of focus to the extent that the dots nearly disappear, and the lens is left at open aperture for exposure. Printing from this negative is also best done by open aperture projection, again slightly out of focus so as to go a stage farther in reducing the dot pattern. But by using a rather contrasty printing medium at this stage much of the dot that still may be showing will finally disappear into blackness in the shadows, and the sharp increase of contrast at this stage will go a long way to counteract the slight appearance of fuzziness that results from blending away the screen-pattern.

Copying by Enlarger.

It is obvious that an enlarger of whatever pattern is a sort of camera, and that by placing a plate in the negative carrier and a print on the easel, and by illuminating the latter instead of switching on the lantern, it becomes possible to make a copy negative. Not only is this possible, but the method has several outstanding practical advantages. Not least of these is that in small premises it is quite practicable to use the same bench and apparatus for copying and enlarging in swift succession.

A more important advantage, perhaps, is that copying by means of an enlarging outfit usually is a means of saving a good deal of time. The way to use it is as follows: A special line plate is placed in the carrier for purposes of focusing. This can be a bleached-out waste negative on to which a few lines have been ruled, or a diagram made by copying some type matter and printing a positive therefrom. It is better to have this plate mainly clear, and that is why the positive will be better than a negative which is mainly dense.

This plate is projected on to the easel, just as if making an enlargement or a reduction, when it is found very easy to pin the original to be copied within the image thrown on the

easel of the focusing-plate. Centralizing in this way is far more speedy than the usual method of examining the image on the camera screen, which usually calls for several adjustments and successive observations of the image. The original having been centred, the brilliant image of the lines on the plate is focused on to the face of the original. As soon as the size of the image fits the original, and the lines are also sharp, the lantern light is switched off. The focusing plate is replaced by a dry-plate (in the dark, or by red light, according to whether a panchromatic or ordinary plate is used). Then, to expose for the copy, all that is necessary is to switch on the lights that illuminate the original for the specified time. Directly the exposure is over, the plate can be withdrawn, and be developed immediately in the same room.

Although the method as described is quite advantageous with the horizontal type of enlarger, it is decidedly at its best if the enlarger is a vertical one, because the focusing to size is so much more rapid, and centralizing of the original is only a matter of sliding it into position on the flat easel. The measuring system of finding exposures described above can be used equally well on a vertical outfit. In an "enlarger-copying" installation it is advisable to pay special attention to the light switches to avoid casualties. That for the lantern should be fixed either in a different place to the one for the copying lights, or if it is on the same switchboard, it is advantageous to fix one of the two upside down or sideways, so that neither of them can be switched on inadvertently, nor both together. Otherwise it is sometimes found that one is liable, for instance, to switch on the lantern (and so to fog the plate) when one is ready to expose for a copy.

Away from the Copying Bench.

Either when the originals are too big to be evenly illuminated with the standard arrangements, or when the work has to be done at the client's premises, or elsewhere, the following problems supervene—

1. Correct illumination.
2. Squarity between original and camera.
3. Exposure.

The order in which I have stated these three points should be noted, because that is the logical order in which they

should be approached. It is useless to arrange the camera carefully at first, only to find a glare of light from behind one being reflected from the surface of the picture! There are cases when the illumination seems entirely out of one's control, such, for instance, as pictures which are painted on, or fixed to, the walls, and which cannot, for one of many other possible reasons, be moved. Even in such circumstances it has been found possible sometimes, when the existing daylight conditions seem hopelessly unfavourable, to make the photographs at night by artificial light. Sometimes the existing electric lighting installation will be found to illuminate a picture better than daylight from the window, and modern rapid panchromatics are wonderful agents for good in such circumstances. A couple of portable lamps, however, can be placed just where one wants them, equally on either side of a picture, on the lines of the method illustrated in Fig. 81. In the case of a large picture, which lamps placed centrally would not illuminate evenly, the effect of even illumination produced by four lamps, as in Fig. 84, can just as easily be obtained in either of the following simple ways: Either the lamps are raised up and down by hand continuously during the exposure, keeping them over the same spot on the floor, of course, or the exposure can be divided into two. During the first half of the exposure the lamps are raised above the top level of the picture, and are canted downwards; during the second half of the exposure, the lamps are lowered to below the bottom of the picture, and are tilted upwards. The cap can be very gently placed on the lens while the adjustment is being altered, but it is by no means essential to do so, provided the lamps are not swung round towards the lens while being lowered!

* When daylight is the best, or the only available, source of light (good daylight is nearly always best for good colour reproduction), and if picture and light are fixed, note should be taken whether the latter gives rise to undesirable reflections, and if so, whether it cannot be partly screened off with advantage. It very often happens that a large window, situated at one side of a picture, is the origin of such reflections simply by reason of its great width, and that it is just the edge of it farthest from the picture, and nearest to the proposed viewpoint, that is reflected. If there is any doubt

about it, the point can be determined absolutely by standing opposite to the picture, and getting someone to move a white object up and down near the suspected cause of the reflections. Seeing the reflection move will be a sure indication of exactly where it comes from. Then the most forward part of the window can be screened off in any way that happens to be available.

In most picture galleries the lighting is already at a suitable angle, and although it is usually at one side of the picture only (generally above) its distance is so great in comparison with the size of a picture that there is no effective inequality of illumination.

Move the Picture.

In the vast majority of cases, however, it is convenient to move the original to be copied, whether it be an oil-painting or a page from a ledger, to where the illumination is satisfactory. If the subject is of a shiny nature, such as an oil-painting, or any picture which is in a frame under glass, it is necessary to arrange either that it should face a dark place, or that sources of reflections are screened off. It is customary for photographers who specialize in the photography of paintings, to have a supply of large black curtains, together with collapsible supports for the same, for this special purpose. The difference between a photograph of, say, an Old Master taken in this way and one without this reflection-preventer is really very striking. The screen should always be considerably larger than the actual picture, and should be set up parallel with it, with a hole or slit for the lens to peep through. Exposure-meter tests will be made, of course, when the screen is in position, but it is usually more convenient to settle the correct adjustment of the camera before erecting the curtains.

To ensure the camera being perfectly square with the picture, it is necessary that the subject itself should be quite vertical, and in the absence of a wall in a convenient place, or of a movable easel, some means should be improvised, if possible, to ensure this, and the spirit-level or plumb-line used to check the uprightness. When the position of the camera has been approximately settled in the ordinary way by visual method on the focusing-screen it is necessary first

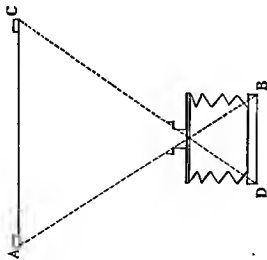


FIG. 85. GETTING THE CAMERA SQUARE WITH THE SUBJECT

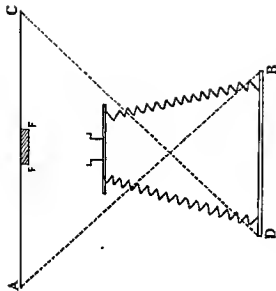


FIG. 86. A SMALL ORIGINAL SHOULD BE FIXED IN THE CENTRE OF A LARGE BOARD, ON THE OUTER DIMENSIONS OF WHICH THE MEASUREMENT TEST, AS IN

FIG. 85, IS MADE

CHAPTER XVII

DOCUMENTS, DIAGRAMS, AND DRAWINGS

COPYING BY PHOTOSTAT, PLATERTYPE, AND ONDOVERAX

Photostat.

THERE is a fairly frequent demand for copies of documents and other types of line originals at a rate both quicker and cheaper than can usually be achieved by making a dry-plate negative and bromide prints therefrom. The Photostat is a camera built and operated especially to satisfy this need. Instead of plates or films, it carries a roll of a specially thin and tough bromide paper, which is fed into the focal plane as required and, after exposure, is cut off and passed through the chemical baths which form part of the apparatus. The originals are laid flat on a platform under the lens, which is fitted with a prism, so that the image on the paper "negative" is seen the right way round. In fact, the "negative" is the result as delivered to the client, namely, it has white lines on a dark grey ground. If a positive result is required this negative is again copied in the same camera in exactly the same way as the negative print was produced. The results are usually of surprisingly good quality, and the Photostat is used in many museums and Government offices. Although the sensitive paper is partly colour-sensitive, it is not so successful as more highly technical arrangements in dealing with such problems as pale typewriting in violet on a buff or pink paper, and old parchments which have become stained and browned with age; and the Photostat certainly will not reproduce tone originals satisfactorily, more especially when they form part of a "line" original, as, for instance, on a page of newspaper. The purpose, of course, of Photostat reproduction is legibility combined with economy, and that it achieves with quite remarkable success.

Focusing with the Photostat is done by moving pointers to various numbers representing the scale of reproduction. Although there are instances of such an equipment having been "home-constructed," it is decidedly not a matter for

the ordinary mechanic. A lens with prism attached, that will cover sharply the whole of a page of newspaper, is a costly item in itself, and is hardly one to be satisfactorily employed on an instrument that is not very precisely built to suit it.

Playertype.

This is the name given to what was formerly considered only a laboratory "stunt," but is now quite a practical method of reproducing documents, and the like, without the aid of a camera at all. It consists in placing a sheet of rapid contrasty bromide paper in *contact* with the matter to be reproduced, and exposing to a light which shines *through* the sensitive paper, and is reflected back on to it from the white parts of the original. In these parts, therefore, there is more density than in those which are merely fogged. The difference between fog and fog-plus-reflection is sufficient to render the bromide paper, after strong development, a quite satisfactory negative for printing by contact.

It is practically essential to use for making the "negative" a yellow filter of some sort over the printing-frame, or over the light by which exposure is made. Exposure is soon standardized after a trial or two, but no attempt should be made to secure a clean-looking "negative." Only one on which the essential detail appears almost buried by reflected light will be sufficiently dense to print from as a clean line result on white paper.

It will be clear from the above that it is quite practicable to reproduce pages of books, and so on, which are printed on both sides, simply by sandwiching the sheet to be printed and the bromide paper between two pieces of glass. For larger matter than quarto ($10" \times 8"$) or $12" \times 10"$, it is almost essential to use a vacuum pressure frame, as employed by engravers and lithographers, both for making the negative and for printing from it. This is because the nature of the subjects, as well as the diffusing qualities of the paper negative, exaggerate very greatly the slightest lack of thorough contact.

Ordoverax.

This is another name for the "true-to-scale" process, used

chiefly for reproducing plans without any wet process which might affect the truth of scale measurements on the reproductions. It is an excellent process for producing good and cheap copies of any other kind of line matter, where reasonable quantities of work are obtainable, and where several copies of each original are required, provided that the originals are on translucent paper.

The process consists of coating a sheet of zinc, or for larger sizes or quantities a special lino-covered table, with a gelatine emulsion that can be purchased from any large dealer in draughtsmen's materials, and which can be re-melted and re-used a good many times. A blue-print from the original line matter is laid down, in the dry state as it comes from the printing frame, upon the gelatine, is left in contact with it for a few seconds and is then pulled off again. It is then possible to roll printer's ink over the gelatine, on which the ink adheres only to the lines, and not where the exposed parts of the blue-print have toughened the gelatine. After inking, a piece of tough white paper is rubbed down and pulled off, bringing with it a perfect impression, which can be repeated with perfection up to thirty times from one blue-print rubbing, and in favourable conditions up to fifty. For larger quantities of one subject it is necessary to make a new blue-print, but it should be emphasized that several blue-prints (either of the same or of different subjects) can be laid down side by side, and the whole area inked up and pulled together on a single sheet.

Ordoverax is useless for tone subjects, but although it is often regarded as an imperfect form of lithography, and one which, by its marked resemblance to bromoil, might be associated with lack of definition, I have myself made perfect reproductions of delicate pencil sketches by its means. The pencil work was done on tracing linen, the texture of which produced a grain of broken dots, and the reproductions, with light and careful inking, gave a perfect illusion of genuine pencil lines.

The one drawback of Ordoverax is its liability to trouble in hot weather. This is usually overcome by installing the system in a cool cellar.

CHAPTER XVIII

LANTERN-SLIDES

EITHER as an occasional side-line, or as a business in itself, the making of lantern-slides offers interesting employment to many. Undoubtedly this work must be taken up sometimes by people who have never seen a good slide projected, and who have little idea of any possibilities greater than the advertising crudities to be seen at any slum cinema (and at some others!) It seems a pity that a process which gives results vastly more pleasing than any print, and with no greater difficulty, should tend, as a commercial proposition, rather to the mediocre.

The prices for making lantern-slides seem to vary as greatly as those of any other branch of photography. The average appear to be those charged by most trade houses, viz. eighteenpence each from customers' negatives, with an additional charge of eighteenpence or two shillings for making the necessary copy-negative when slides are required from photographs or drawings, and so on. Some firms make a specially increased charge if the original to be copied needs a panchromatic plate and filter to produce a really good result while others satisfy themselves with copying every kind of original upon the same variety of unbacked plate.

It must be added that cases have been brought to the writer's notice of enormous variation in prices charged for this part of the work, as well as for making the slides themselves. Ninepence each for negative or slide is a price that prohibits employment of skilled workers, or the scrapping of imperfect slides. Seven and sixpence each for ordinary black-tone slides, on the other hand, is a charge that is bound to alienate custom. It must be recorded, too, that high prices are not found to be necessarily synonymous with the best grade of work. In fact, the volume of utterly bad lantern-slides that have passed through the writer's hands for repair or reproduction in recent years, lead him to suppose that many lecturers have no idea how very good lantern-slides can be.

There is no reason at all, for instance, why a diagram should appear on the screen as though it had been cut out of a badly printed newspaper. Even if the original were from such a source, the simple processes available make it easier to improve vastly upon such poor subjects than to produce the best possible slide from many a "perfect" negative.

— Lantern-slides can be made either by contact, as in ordinary bromide-printing, or by reduction from a larger size of negative. There are many theories as to which method is the better, but as far as the professional is concerned he has little choice in the matter. If the negatives are already existent the question depends upon the size of the actual subject matter in them, whether they can be printed by contact or not. There are two circumstances in which it is advisable to print by projection in the (enlarging) lantern even though the size be suitable for the contact method. If the negative has any masking strips upon the film, or even if it has been painted out in parts with any but the smoothest of colour, it will be found impossible to obtain the absolute contact between the two films that is so essential for minute rendering of detail.

Certainly sharpness *can* be obtained even when there is not contact, simply by using an undiffused direct light for the exposure, such as that from light at a distance of several feet, but the effect will be to print at the same time all the little specks of dust and flaws in and upon the surfaces of the negative and its glass supports. The second case is when a negative has been retouched, or even when it has had much "spotting" done to it, a contact printed slide will tend to show up such pencil or brush work as so much "clear glass," or, in other words, as transparent spots and scratches.

Reducing with the Enlarger.

It may not be quite clear to the uninitiated just how an enlarging lantern is used to make the reduced size of image necessary when the negative is too large for contact printing. It is done merely by employing upon it a lens of shorter focal length than would normally be used for enlarging, but at the same time a greater extension of the bellows, while bringing the easel very close. It is essential that the easel should

slide easily for convenience in focusing, for it is impossible to effect this by racking the lens in and out.

If the enlarger is of the condenser variety, it is desirable, in addition to the usual ground-glass diffuser between lamp and condenser, to add one or two extra thicknesses of this, with spaces between each layer, or one of opal glass. This affords the double purpose, first of subduing the light to a degree permitting of reasonable control of exposure (for in reducing the image is concentrated to a small area and is therefore extremely brilliant), and in the next place of making sure that in getting a sharply defined image one does not at the same time reproduce all the dust specks and slight film scratches that otherwise would spoil the result.

There is just one other point in the use of a lantern that should not be overlooked. In making enlargements, it is not usually of importance whether the paper lies flat all over the easel or whether a slight hump takes it a twentieth of an inch away. In making slides, on the other hand, it may sometimes make all the difference in the world, so that focusing should be effected, not on the surface of the easel, but upon a dummy lantern-plate pinned upon it. The dummy can be a bit of cardboard cut to size, or a cover-glass covered with a bit of white gum paper. In either case it is a great convenience to have a black margin upon it, representing the binder of the finished slide, so that one can be sure of centring the picture correctly.

For supporting the plate upon the easel there are many contrivances which will occur to the photographer of an inventive turn of mind. Otherwise a bit of cork lino fixed to the face of the easel, and three drawing pins will be found simple and effective. Two of the pins hold the plate at the bottom edge, and the third acts as a stop at the side, so that it becomes possible, after centring and accurate focusing, to remove the dummy and to slip a lantern-plate into absolutely correct register without loss of time.

Reducing Wastage.

There is, in good lantern-slide work, probably more wastage than in most other branches. To a very great extent that is due to the supposition that it is not practicable, as it is in paper-printing, to make trial slips. A shilling wheel

glass-cutter, however, will very quickly cut up a couple of plates into half a dozen strips each. The deliberate "wasting" of these in making a test exposure here and there in a batch, will go far to reduce the number of "repeats," as well as those which one would like to scrap, but which are "passed" in a moment of weakness.

There is another way of making "trials" which is not as well known as it should be, since it is of great service in enlarging, as well as in the making, of lantern slides. If a negative is focused up in the enlarger and a trial slip of paper exposed, and then the negative is removed from the carrier and merely held against the easel, in the same beam of light, with another strip of the same paper behind it, a similar exposure should produce a trial print of different size but of the same characteristics if the two are developed together.

When, therefore, a batch of negatives has been cleaned and sorted out ready for reducing to slides, one can judiciously select a few representative ones for trials, and even if the idea of cutting up plates is felt to be objectionable (as curiously it is by some people) a set of such contact trials upon bromide paper will at any rate provide comparative degrees of exposure between one and another and will show what local shading may be required.

Avoiding Fogged Edges.

There is one precaution which is required to be taken in printing lantern-slides by contact, which is not found necessary in the case of paper. That is to have the negative in a mask or carrier frame, in such a way that light is prevented from striking into the glass edge of the lantern-plate. There is a tendency for strong light to penetrate quite a good way horizontally into the glass and produce a graduated band of fog, which is often put down wrongly to staleness. The latter will cause a foggy edge of another kind, but this is usually iridescent by reflected light.

Another form of fogging may be caused if the easel on the one hand, or printing-frame backs or perhaps the finger-tips in contact work, are not prevented from reflecting light coming through the very transparent emulsion by means of a bit of really black paper in between.

Apart from the precautions suggested there is little to distinguish the making of lantern-slides from paper-printing. In either case one wants the result to *look like the subject that was photographed*. That is a point of view that is often overlooked when a print or slide is examined. "Is it a good likeness?" is the first question to be asked in commercial work as much as in portraiture, and is an excellent guide. A piece of opal glass with a lamp behind it, or reflected light, must be used for examining slides, and while brilliance is essential, the shadows must remain quite transparent.

Diagram Lantern-slides.

There can be not the slightest doubt that the best slides of line diagrams, or of lettering, are made upon gaslight plates by contact from clear, sharp negatives. Not only has a "gaslight" emulsion the quality of producing extreme contrast, namely absolutely opaque black lines on an equally perfect clear-glass background, but also the exclusive quality that there is no tendency for the lines to spread, as they do to a slight extent, even with the best bromide emulsions. This feature results in a wonderfully bright and clean-cut image on the projection-screen, which is welcomed by both lecturer and his audience. It has the advantage also that if the original negative has some very fine slightly clogged lines amongst the detail, these can be printed up on the slide to a sufficient strength without fear that the bolder parts of the detail will be spoiled by spreading through over-exposure. In this connection it may be stated that both bromide and gaslight lantern-plates can be obtained backed, if ordered from the manufacturers, and the improvement in clearness and quality is well worth the additional small cost, as can be ascertained by the practical comparative test of backing one-half of a plate.

Both because of their great brilliance, compared with that of *tone slides* with which they are usually interspersed during a lecture, and because of the marginal defects of most projection lenses, diagram slides should usually be made rather on the small side in the centre of the plate, and should be masked close up. Two inches in greatest length on the lantern plate is usually quite large enough for diagrams.

Gaslight Precautions.

Gaslight plates are subject to the same simple precautions as gaslight papers, in regard to avoidance of stains and forcing fog, and there is just one additional feature that should not be overlooked. The gelatine coating of gaslight plates is even more tender than that of the bromide variety, and the latter are often more so than the average dry-plate. Therefore, when setting them up to dry from the washing water, the usual swabbing with cotton-wool should be carried out with great care not to do anything in the way of actually *rubbing* the surface. This should not be omitted, because one does not want to leave any acum from the water to be magnified on to the screen, but it is preferable to use a new bit of cotton-wool, and just to let it "slither about" over the gelatine by its own weight under the flow of water from the tap. Otherwise the surface may show a network of very fine scratches on drying.

"Tones" on Lantern-slides.

All lantern-slides can be toned by the same methods as bromide prints to a remarkable variety of tints, and methods are described fully in books upon the subject. The commercial photographer will usually not need any very striking colours, but will sometimes desire, or be asked for, some reasonable departure from the normal monotonous black-and-white, that can be made without too much trouble or expense as well as with certainty. There is, fortunately, quite a range of effects that can be so obtained.

The simple plan of increasing the exposure, which increase is compensated for by plenty of potassium bromide in the developer, will result in a greenish tone that is very objectionable on a commercial print, but often quite agreeable when seen on the screen in a darkened room. The same method used upon gaslight plates can be made to produce many striking tones, even reddish ones, but the actual colour obtained is dependent upon so many factors that it is not possible to foretell it.

The ordinary sulphide-toning process is very suitable for lantern-slides. The actual colour cannot be seen till the slide is quite dry, as it is distinctly warmer when wet. There is

one feature about the sulphide bath that should be noted which shows itself in places supplied with "hard" water; that is an objectionable scum which is seen on the surface of the dried slide, and sometimes is difficult to remove. To avoid this trouble, it is preferable to wash the slides preparatory to toning in a grooved tank, and not flat in a dish. In any case, it is advisable not to wash them for longer than is consistent with the complete removal of hypo, so essential before sulphide-toning. By reason of the very thin coating of gelatine, this washing can be quite short, and the slides should be gently swabbed *before* as well as after toning. If these precautions are found not to prevent the scumminess, the deposit can usually be cleared by immersion in a weak bath of hydrochloric acid for a few moments, followed by a further short wash. Further slides can be treated with acid before toning, but they will be found to be very tender, and will take longer to dry, so that the acid bath must be regarded only as an emergency measure.

Two variants of the sulphide-toning process will probably be found sufficient, together with the above mentioned, for most commercial requirements. The first is to immerse the slides in the sulphide solution first of all, then to wash briefly before bleaching and again sulphiding (for which the same bath as the first can be used). The effect of this is to produce a very cold colour, far nearer to a real "sepia" than the direct bleaching method. The degree of coldness depends largely on the length of the first sulphiding—the longer the colder.

The second variation is to use a very weak bleaching bath in which the slides are gently rocked until the slides are only partially bleached. For an effect "just off the black" they should be taken out as soon as the highest lights are quite white. For a warmer effect when only a little grey is left in the shadows. Whichever stage at which the bleaching is stopped the resulting colour, after the final sulphiding, is quite different to that obtained by complete bleaching, and there is no suggestion of any crude "double-toning" effect if the above simple instructions are carried out. Slides toned by this method are particularly attractive if they were originally of the rather greenish tint produced by slightly over-exposing, and restrained developing.

Masking and "Spotting."

It is not intended, in a textbook of this character, to give elementary instructions for masking and binding lantern-slides; but a few notes will not be out of place on points that help to produce the most highly-finished commercial article in the easiest and quickest way. Stock masks are useful only when numbers of slides are made of subjects that can be fitted into a stock mask. Most will prefer to mask each slide individually to isolate each subject to the best advantage. This is done by the use of strips of paper, and results in perfectly sharp, clean edges and corners to each. For small numbers of slides, gummed *passe-partout* binding is suitable, or black paper from the dark-room can be cut up into strips, provided it has been saved *uncreased*. For toned slides I like to use brown *passe-partout*, and for black ones a surfaced black paper, which I think makes the slides look nicer in the band; though admittedly it makes no difference on the screen. What I always try to bear in mind is that the customer usually examines the slides themselves close to, in a good light, and he will be gratified by a nice-looking finish, much as a photographer may be attracted by nice mahogany and lacquered brass, although his old and battered camera may be producing quite good negatives. For the same reason I never moisten or apply gum to the masking strips excepting at the extreme edge which goes inside the binder, so as to avoid ugly blobs showing on the back of the slides when they are being cleaned, prior to a lecture.

"Spotting" a slide means the application of white spots to show which way up the slide is to be put into the lantern. The photographer need never confuse himself by bothering about what the lanternist does. All he needs to do is to think of the slide "as a print"; that is, face up, and to put the spots at the top. Spots are best stuck on to the mask under the cover-glass, and a lot of spots can be punched out of a gummed label or two by means of an ordinary letter-punch. Better than spots, to my mind, is a strip of strong white label stuck to the outside face of the slide, close to the top edge, since it affords at one stroke a label to write the title on, and a very efficient substitute for the spots.

Prints from Lantern-slides and Cine Films.

It happens occasionally that a slide or a cine film is the only available illustration of a subject. The increasing popularity of the 16 mm. home cinematograph is likely to make such occasions more frequent. Unfortunately, the particular kind of gradation suited to the projection of transparencies is very different from the reproduction ideal, so that great care has to be taken to avoid very intense crudeness in the finished print. As in practically every case the print is required on a larger scale, it is a very good plan to commence making the necessary negative by projecting the transparency, placed in the carrier of an enlarger, on to a dry-plate. It is a frequent misconception that a direct light in the enlarging lantern will produce a sharper result from the slide or film. What usually happens is that the resulting negative is remarkable far more from the brilliancy of the scratches and grain-texture upon it than for that of the picture-image, which is so often ruined by the foregoing markings. A diffused light lantern will produce the best result, and certainly one far superior to that made by contact. There is no need at all to unbind a lantern-slide before reproduction.

The negative should be developed rather on the soft side, so that all possible gradation is retained, for it is seldom possible to make a print approaching anywhere near to the brilliancy of this sort of original without losing much of the actual detail. If the subject is of sufficient importance to warrant the extra work, it is decidedly advantageous to make the print two or three sizes larger than it is actually required, work it up with pencil or brush, and finally copy this result, making a negative rather more "plucky" than the first one. By this method remarkably good results are secured.

CHAPTER XIX

BACKGROUNDS AND BLOCKING-OUT NEGATIVES

IN very many branches the commercial photographer necessarily has to take his subjects against the existing backgrounds as he finds them. Beyond finding a point of view which tends to subdue objectionable details in the surroundings, he can in many cases, do nothing except resort to after-treatment of the resultant negative or print.

There is a very widespread idea, one finds, that if a subject has subsequently to be blocked-out, it does not matter a bit what the background is like. This is quite wrong. Naturally the worker who has to paint out the negative has an easier task if there is not a jumble of extraneous detail to confuse him, but quite apart from that the nature of the background has a far greater effect on the appearance of the subject than is usually suspected.

A Very Prevalent Misconception.

If anything, from a horse to a nutmeg-grater, be photographed twice, first against a lightish background, and next against a brick wall, the lighting, exposure, and other factors being the same, and the two negatives are painted out, it is erroneously supposed that prints from them will be identical. It is easy to experiment with a few small objects, without exposing a single plate, by placing them in a good light, and carefully noting how different they look when someone quickly slips behind them in turn a white card, a black one, and a patchy surface, such as a chessboard or a newspaper. The difference will be more marked with shiny articles, but it is always there. (See Figs. 65 to 67.)

It is an absolute fact, and one easily tested and proved, that most things which will have to be blocked out, especially those with shiny surfaces, turn out better if they are photographed, neither against a pure white ground nor a black one, but against a grey one. In the case of machinery, it is quite usual to see some attempt made at rigging up a sheet of some sort, often hanging in festoons, and sometimes

showing an abrupt edge through being too small for the subject. A sheet used for this work soon accumulates smears, too. This would not matter if these irregularities left off at the outline of the subject. Unfortunately, the creases and blotches produce unevenness, by reflection, in shiny bits of the subject they come against. Therefore, in such work, steps should be taken to keep the sheet moving continuously during the exposure. Even a newspaper, moved about without stopping so as to show a short while over every bit of required background area, will turn out better than a still, but patchy, arrangement, even if it only produces the effect of a mist over the real surroundings, instead of blotting them out. (See Fig. 4.)

When photographing small objects for block-making, it is easy to have a selection of sheets of paper or card, and to choose one of a suitable depth of colour for each article. Once it is realized that the character of the background *does* make a big difference to the actual object (see Figs. 63 to 67), the operator will very quickly learn to observe the changes that take place. After a little practice in trying the effects produced by backgrounds of different depths, he will soon be able to choose off-hand the right ground for any article. A very instructive little experiment in this connection is to support a sheet of glass like a little platform an inch or so over a table, so that a sheet of paper can be slipped under it.

Two or three sheets of various depths (ordinary white and brown wrapping papers will do well) are taken of a width to run under the glass and long enough to turn upwards so as to form a background for anything placed upon the glass. In this way the ground of any tint can be made to show all round the article instead of behind only. It is suggested that a few ordinary objects, say, an apple and a banana, a piece of bread and a lump of coal, or anything handy, be placed upon the glass platform. The sheets of paper are slipped in place, and a confederate is asked to hold them up behind, and to whisk them out in turn, while the observer watches closely the changes of light and shade in the objects themselves. It will soon be realized that the area of the background will often have as great an effect for better or worse as its tint, since the light reflected from a small sheet will not always reach every detail. This fact also is learnt

more easily from a three minute experiment than from merely reading and doubting. The suggested arrangement is treated and illustrated in Chapter VII, Fig. 62

When Effective Lighting Spoils the Grain.

Many small objects, it is found, such as polished clock-cases, present the problem that the use of a white or light-grey sheet, extending well forward upon the bench as well as upwards behind, produces the desired effect of relief in the details of moulding and carving, but at the same time show a reflected haze over the french polish, totally covering up the grain of the wood. The best method of coping with this class of goods is to retain the effective lighting, and to "cut out" the glare by a panchromatic plate with a deep yellow or red filter. The exposures are comparatively long, since a small stop may be required, and daylight may not always be available.

Blocking-out Backgrounds.

A considerable portion of commercial photography is of necessity done with any sort of background that may be available, or with none at all but a jumble of detail, and the subject must be painted out upon the negative. The method of doing this can be varied considerably, according to the character of the negative, and the subsequent printing arrangements, but one essential is that good brushes should be used. To choose brushes for this work, or indeed for any water-colour work, even for the humblest of spotting, one should go to a good artists' colourman, and ask for red sables. Any reliable firm will have a glass of clean water upon the counter with which one can try out the brushes, and select those with a good point and spring.

The Best Brushes Cheapest in the Long Run.

These first-rate brushes will cost a few pence more each than cheap so-called "spotting brushes," and it is an advantage to have a range of sizes, but the extra cost will be made up over and over again in saving of time and ease of work, and good brushes have quite a long life if conscientiously rinsed out after use.

The negative will be all the easier to work upon if it has

been properly washed free of chemicals and allowed to dry spontaneously. Where the existing background is already of a fairly light value a dye solution is a very convenient medium to employ, for it enables one to follow the outline the more accurately for being transparent. There are dyes sold for this purpose, but if these are not available a test should be made of any that may be bought to see if they can be washed out in case of error. If opaque paints are preferred, or are necessary, there are several on the market to choose from. Whichever is chosen, it is better to take upon a sancer or palette sufficient for the work in hand rather than keep on dipping into the stock.

Aids to Accuracy.

The actual painting out of outlines is a matter for painstaking practice at first which soon develops into confident ease, for it is not, like other retouching, so dependent upon temperament. Straight lines are best ruled with a draughtsman's pen and ruler, but it is easier if the corners at the ends of any inside straight lines are started by brushwork, since the line produced by a drawing-pen neither starts nor finishes with a sharp point. Fig. 87 shows an enlarged portion of a negative of iron girders through which floor-boards are seen, and has been enlarged considerably to show clearly the way fine detail can be blocked out. At *A* is a very narrow angle. It is clear that a ruled line *B* can never fit a corner accurately because a ruled line always has a rounded end. Therefore blocking out should be commenced, as at *C*, by fine brush strokes made from the corner outwards. A line can then be ruled into the prepared corner as at *D*.

When the outlines are complete, a larger brush can be used to run a broader band of dye or of opaque up to, and just overlapping, the narrow line already accurately made, producing the effect of Fig. 88. Finally, either opaque paper or paint is used to cover the remainder to be deleted. There is a strong tendency in beginners to try to follow an outline in a more or less continuous stroke. This is fatal to good work, since to go *round* a corner is contradictory, and each side of an angle should be done with an independent stroke.

Again, when there is a series of lines or angles of identical or similar character such as exists in the case of a screw thread,

a length of "flex," a spring, or a wheel, it is well to do all the lines first that run one way, and then all those that go another and so on. The hand soon gets into a sort of semi-automatic action which assists accuracy. It may seem a small matter when one is merely following an outline which way one goes but it must be remembered that the edge of a brush mark is very much sharper than any detail of the negative and in



FIG. 87. ANGLES OF DETAIL SHOULD BE BLOCKED OUT WITH A BRUSH, BECAUSE RULED LINES HAVE ROUNDED ENDS

See page 251



FIG. 88. BROADENING OUT THE FIRST OUTLINE

many places an inaccuracy of a hundredth of an inch may mean all the difference between a perfect and a second-rate job. The need for extreme accuracy is all the greater when enlargements are to be made.

Alternative Media.

In cases where the background is already almost opaque and only a light tint prints through, several easier alternatives are open to the operator. A very weak dye solution can be run round the subject with less meticulous care than

usual, or a coloured varnish can be flowed over the glass side and, when set, may be scraped away from the subject portion. A special preparation for this purpose, as well as a ruby matt-varnish, is listed among the well-known Vanguard specialities. If only plain matt-varnish is to be had it can be used without scraping by coating on the glass and by painting out on it with opaque colour, or even by rubbing on with a soft pencil. The diffusion of the matt coating allows of slight inaccuracies being unnoticed upon the print. This process though, carefully employed, is far more useful for strengthening weak areas in negatives than for actual deletion of dense ones.

On no account should Indian or Chinese ink be used for painting on negatives. On drying, not always immediately, but inevitably, innumerable cracks appear. Of ordinary water-colours Indian red is probably the most opaque, but the special preparations usually contain rouge as the principal ingredient, and this gives a denser deposit than any other pigment.

The Time to be Cautious.

The regular procedure of blocking-out, whichever method he adopted, is to complete the outline first, and when this is dry, to broaden the first thin line of density into a band of about three-eighths of an inch wide, using a larger brush (see Fig. 88). The comparative ease of this stage should not be allowed to lull one's feelings into a state of over-confidence, for a slip with the big brush, and the whole of the previous work must almost inevitably be washed off, especially when dye is used. For this reason, it is better always to work on the part of the negative nearest to one, turning the plate as required, than to pass the well-laden brush across the work. A sheet of ruby paper, afterwards tipped with gum to the glass side, can be cut through with a pointed knife, and forms a more satisfactory mask, in many cases, than painting over the whole of the outlying surface.

Other retouching of negatives is really outside the scope of this book. In any case, it cannot usefully be dealt with in a single chapter; failing personal instruction, the student is advised to get a book dealing exclusively with the subject, and practise, practise, practise.

CHAPTER XX

COMBINATION PRINTS

THERE are many purposes for which the combination of prints from two or more negatives is required. It may be simply that a lettered title or a cloud is required to be inserted into a photograph of a building, or on the other hand it may be desired to produce a novel and striking effect for advertising purposes. As in many other departures from normal every-day practice, there is a variety of methods to select from, according to the individual job. The methods will even differ according to whether there is to be only one final print or many.

Line with Tone.

For instance, if some lettering is to be inserted into a photograph one has first the very simple plan of writing or printing the matter on a photograph, and then copying the result. A second method is to make a line negative of the lettering, which is stripped and floated into position on a space cleared for it in the subject negative. A third method is to carefully make a register device for double printing from the two negatives, so that however many prints are made the lettering will infallibly come into correct position on the photograph. The fourth method is to make the prints by projection, centring the matter on the bromide paper either by means of register pins in the easel, by pencil marks on the paper itself, or by registering the actual images through a safe red glass on the enlarger lens.

The first named method, of writing on a print and copying, is subject to the slight loss of quality often inseparable from copying. The lettering will rarely be so black in the result as could be desired simply because the copy negative of a tone subject will rarely show black lettering so glassy clear as one on a process-plate. This method is the best when the final results are to be some big enlargements, on which correct registration of separately-printed lettering is not easy, and the undue exposure, even to yellow light, of large sheets

in the course of double printing (for handling large prints always occupies far more time than small ones, or even than one notices while working) conduces to the risk of spoiling them by general fog.

The stripping method is suitable when a long run of prints is required, and is the usual method employed in post card view work. Double-printing by register is the best when a

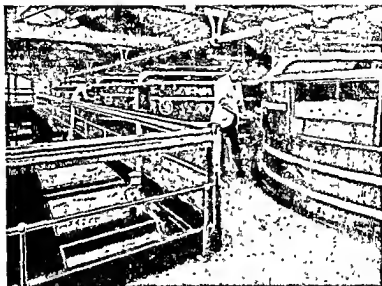


FIG. 89. THE WORKMEN WERE INSERTED INTO THIS INTERIOR FROM OTHER PHOTOGRAPHS

small number is needed, as for travellers' albums, or a short run of showcards, for the lettering can be printed right over the subject if need be, a good solid black letter is usually assured, and subsequent editions of prints can be made with or without the lettering as required, with equal ease and speed.

The projection method is the best when accurate position of the lettering on the subject-matter is important, and when a single result only is needed.

Black Letters into White.

When the lettering is to be *white* upon the subject, even if the original wording to be reproduced on it is ordinary black

type, the process is quite easy, though a little more round-about. A good clean line negative is made on a process plate of the lettering, and from that a positive plate. This latter is now in opaque letters on a clear-glass ground, and is therefore the negative we need to print white lettering, and it can be used in either of three ways. If we have taken the precaution to reverse it "left to right" (which is easily done through the enlarger simply by placing the first negative film up in the carrier) this clear-glass plate can be laid in contact on the bromide paper, and the subject negative projected on to the paper through it. The opaque letters will obviously stop light getting through where they are, and they will remain white when the print is developed. A second method is to place the two plates together in the enlarger-carrier, and to project both together. For this method no reversal is required beyond that which takes place when the two plates are clipped film to film in the carrier. For a run of contact work it is better to strip the line plate and float it on to the subject negative. The method of writing on a print and recopying is never satisfactory with white lettering, because the letters from a copy negative of good printing gradation will inevitably reproduce them as of a pale grey.

Clouds.

To insert clouds into an otherwise blank sky is fairly easy, but needs some discrimination in the type of cloud negative selected. The average cloud negative is an over-corrected and often under-exposed arrangement, very charming as a cloud study in itself, but having the empty sky parts very thin, and the clouds themselves somewhat dense by contrast. When one attempts to print such a negative into a subject having a white sky, it is found hardly possible to do so without showing either a band of the original white below the new overdark sky, or a layer of the latter too definitely showing across the buildings or what-not of the subject print. Cloud negatives for printing-in purposes are best when there is a fair area of plain sky on them below the actual clouds, and when they are of reasonable density all over. They can then be graduated by steady vignetting, without the fear that an extra half-second will produce a horrible dark edge.

Such suitable negatives are more easily made than purchased, by taking a dozen quarter-plates out with the reflex camera on a fine day, taking care to include a bit of the horizon line at the lower end of each. Panchromatics can be used with advantage, but the use of a filter, so wonderful when making cloud studies for their own sake, is best avoided



FIG. 90. COMBINATION PHOTOGRAPH
The advantage of a good headlight

when the negatives are wanted for combining with other subjects.

The easiest way to insert clouds with development papers is certainly by double-printing through the enlarger. Having exposed the paper to the subject negative, the print is placed on the enlarger easel and the cloud projected on to it. The subject portion is shielded by means of a piece of card held somewhere out of focus between lens and easel, and kept moving so as to avoid an abrupt join. With a carefully selected cloud of the right sort it usually will not matter if

a very slight tinge of the cloud happens to come across the top of the subject. It may be taken as a general rule that only the boldest and strongest subjects will stand a heavy cloud top to them. Quite apart from any questions of "art" or "effectiveness," it should always be remembered that strong clouds really means dark sky round white clouds, and it is the darkness of the blue "background" that gives rise to difficulties of printing in. When a number of prints from one subject is required to have clouds printed in it very often saves time and trouble in the long run to make one really good combination print somewhat larger than the required finished size, and to copy this result in the camera. This method allows of improving by hand-retouching an imperfect blend between sky and subject.

Changing a Background.

When it comes to more ambitious and elaborate combining of subjects from two or more negatives, there are three distinct methods which can be used. Each of these has its own advantages and the reverse, which need to be considered according to the individual circumstances of each case. There is first the method of masking out, either by cutting a print, or painting out on each negative, and printing the two to correct register. I do not propose to describe this method in detail, because although I have read descriptions of it many times, its success in practice has never come within my own experience. It does not seem practicable to secure perfect register, and the results need more retouching of the joins than the elaborate preliminary work seems to warrant. Then there is the perfectly practical plan of making a positive plate (often called a "transparency") from the blocked-out negative of the centre subject, which will then have a clear surround. Application of some weak red dye solution to the subject on this positive will render it sufficiently opaque for the next stage, which is to place it in contact with another plate, on to which the "background" negative is projected. The temporarily dyed positive acts as a mask which leaves a corresponding clear space on the resulting positive of the background. Then the dye on the first one can be washed out, and when both positives are dry they will be found to register perfectly when adjusted together.

From this combined positive it is easy to make a negative again by projection in the enlarger. The advantage of this method is that the proportionate strength and contrast of the main subject and of its final surroundings can be regulated to a nicety before they are actually combined by straight photographic methods. In some cases it is actually possible to graduate one subject into another by the method described above, provided that the first transparency has its outlines vignettted instead of abrupt and sharp. In skilled hands the use of reducer locally on the positive is invaluable when dealing with a subject of irregular shape, the blocking out of which, with sharp outlines, would make the combined result too obviously a fake. If, however, such reducer is applied to one part of this positive, the whole of the clear surround should be gone over with weak reducer also. The reason for this is that there is almost sure to be a slight trace of developing fog over such clear area on a plato, which does no harm till part of it is reduced away, but then shows itself plainly and objectionably. This transparency method is probably the best when the details to be combined are required to be blended rather than inset with sharp outlines, and when a minimum of retouching can be done to the results.

Staged Combination.

Another plan to combine subjects with a different surround is to mount prints of the former on card, which is then cut out and erected in the desired positions in front of a print of the scene. This is very satisfactory in some hands, and can be made to give quite surprising illusions of perspective, especially if the shadows of the cut-out details be used, but it is by no means so easy or straightforward a method as might appear on the surface, and should be approached with caution by the beginner in this sort of work. Fig. 90 is a simple example: This photograph of a cyclist was taken actually by the light of a motor headlamp. It was not practicable to expose for the car at the same time, for the large aperture necessary in the circumstances would not have defined the car sufficiently. So the latter was photographed separately, and a simple combination, as described herein, was effected.

Combining by Pasting.

By far the most speedy, and for many purposes the most practical method of combination work, especially when a number of details are to be combined, is by the use of prints, cut out and mounted one upon the other. Even here it is by no means a matter of just making so many prints and cutting them out, if a really effective illusion of reality is to be attained. It may be necessary to make several prints of each part, varying in size and strength, with which to experiment by laying them out and after roughly cutting out, selecting those that seem to go together most naturally. Even then, local reduction on parts of prints which clash with their final surroundings may be desirable. When the selected set of prints is finally dry, the cutting out is best done in the celebrated Air Force manner, by first cutting just through the gelatino with a sharp blade, and then tearing the paper base from underneath, leaving the detail with a graduated edge that has no thickness at all at its extreme outer margin.

These prints are then mounted upon one another, or upon the background print, with stiff paste, which allows of slight adjustment in the way of sliding them till their various positions and overlappings seem correct, when the whole can be rubbed down and surplus paste gently swabbed off. If the mounting has been done on a fairly thick card, it is a very good plan when the whole is thoroughly dry (but not on any account before) to give it a good squeeze in a heated dry-mounting press. This will produce a perfectly level top surface, all the variations in thickness being compressed into the body of the cardboard, which fact is realized on examining the back of the mount, where the impressions of the various parts can usually be plainly seen. After suitable retouching, if any should be required, the whole can be copied, and a new print, bearing no signs of the methods adopted, is ready for the client. An example of this variety of composite is the frontispiece (Fig. 1).

The pig (a very realistic model) was treated by varying angles and lightings, and the same applies to the pair of real wings from a poulterer's. Selected prints were cut out and pasted on the background (a reflex snapshot). After a very little retouching, the whole assembly was copied in the camera.



(Photograph by the Author. By courtesy of Messrs. Shell-Mex and B.P., Ltd.)

**FIG. 91. THE LANDSEER LION (TRAFALGAR SQUARE) THINKS
ABOUT HIS BREAKFAST
(Inset, as he is usually seen)**

Another example of this type is Fig. 91, in which there are no less than a dozen separate prints, and scarcely any hand-work in the way of retouching. All the photographs contained in this composition were made with a quarter-plate reflex.

Seen Through One Another.

There is, of course, the sort of combination photograph in which no attempt at reality is made, but which seems to result in an impression of cleverness on the part of the producer rather than in any definite picture or message. I refer to the kind of photograph, really quite easy to make, which results from giving a sheet of bromide paper exposures all over to a series of negatives, giving only a proportion of the full exposure that each individual subject would require for a full strength print. By this means a single photograph can produce an impression, for instance, of the manufacture of some article, from the raw material to the packed carton, or an idea of tremendous activity by reason of the immense number of people or vehicles overlapping one another in all sorts of positions and directions.

Photomontage.

The kind of thing described above must be differentiated from what is called "photomontage." This latter is the kind of combination, produced by similar methods to the cut-out-and-paste-on process previously described, but resulting in a mosaic of individual pictures. These are usually overlapped at the edges, in the manner of the Air Force mosaic, and usually are a collection of prints all bearing upon one single subject or idea. The result is often very dazzling, but each individual piece can be examined independently, and the whole effect to my mind is not only more impressive, but far more intelligible, than that obtained by overprinting subjects on top of one another. A successful result in photomontage is rarely obtained by haphazard methods. It usually calls for quite a considerable amount of thought and of patient arrangement, quite apart from the neatness and dexterity required for the actual manipulation.

CHAPTER XXI

PRECISION WORK

PRECISION may mean either of two things. It may have a general sort of meaning, in the sense of some of the definite methods I have outlined in other chapters, for obtaining good results without guessing or fumbling. For instance, the reader may regard the chapter on "Copying" as being quite unnecessarily precise, because his more primitive methods have always produced quite good copies of old photographs which, with the possible aid of some artist's work, have brought him quite good prices. The commercial photographer, however, using a more "scientific" system, will be called upon to produce an infinitely superior reproduction, with no artist's work at all in an hour or two for a few shillings. Moreover, by installing a "precision" system, such as the one I have described, he will be able to leave ninety-ninths of his copying to be done by a junior, confident that his standard will be maintained.

Real Precision Rarely Required.

That, however, is really only an elementary form of precision. In quite a number of directions commercial photography calls for a much greater degree of accuracy as regards the results desired, and consequently as regards the methods to be employed. No commercial article is ever "exact." Even the Standard Yard of the British Empire has been known to vary in its length, but it requires highly scientific methods involving optical "wave-lengths," to detect such variations! In many factories gauges are used for checking the "tolerances" of error permissible in the articles produced. There will be not only a "correct" gauge, into which an object will just fit, but also two other gauges, one just "loose" and another just "tight," providing the limits of the "tolerance." The difference between these latter will often be so minute that the naked eye can scarcely perceive it, and the mere act of testing so soon wears away the solid metal that the tight gauge becomes loose and so

requires replacing long before any ordinary methods would detect an error.

The commercial photographer may feel happy that he is never called upon to work to such a degree of accuracy as that suggests, and such as is employed in the manufacture of the lenses he himself uses. That photography *can be* worked as accurately is evidenced by the fine glass scales (graticules) used in military range-finding instruments and the like. During the Great War it was determined, as the result of much research work by Mr. H. O. Klein, F.R.P.S., that *only photography* was capable of giving him the extreme accuracy required! The commercial article is made to an accuracy of somewhere around 0.0007 of an inch, and depends upon photography for reaching that standard!

It has to be admitted that average photographic apparatus is not built for precision work. The purpose of this chapter is to explain in just what kinds of work accuracy (in varying degrees) is usually needed, just where to look for trouble when the demand is for accuracy, and how to attain, as far as individual circumstances permit, sufficiently close to the ideal.

Simple Subjects with Uprights.

Case one is a very frequent example indeed. Some objects having "uprights" are required to be photographed for a catalogue. It is often the case that the printed blocks of such subjects come quite close to the edge of the paper on one side and to columns of letterpress on the other. It is objectionable in the extreme to see such articles (furniture, fireplaces, etc., etc.), represented with sides that lean. The very proximity of the blocks to mechanically-produced parallels will certainly make any such inaccuracy unduly noticeable. It is quite easy to level the back of the camera to perfect verticality (see Figs. 47 and 48) by means of a real spirit-level, in place of more primitive methods. That, however, is not always enough! For instance, if the tiled fireplace, or the headstone, has been temporarily placed in position to be photographed, the chances are that it slants back against the temporary support; in which case the levelling of the camera-back will not give the perfect uprights in the negative, and the client will certainly complain.

When Subjects Lean.

It is advisable, in such a case, either to have the subject supported truly vertical, or to "pack out" the level in the manner shown in Fig. 92, first against the face of the subject and then, with the packing still against the same part of the level, adjusting the ground-glass screen till the bubble is central. This, it must be admitted, is rather rough-and-ready rule-of-thumb than a "precision" method, and should only be used when the subject is very slightly out of upright.



FIG. 92. PACKING THE LEVEL FOR LEANING SUBJECTS

If the subject is a small object that can be placed on a bench or other platform, it is far preferable to adjust it to a vertical posture before commencing to photograph.

Dead-square.

Let us next take case two, that of a building or pair of gates, or similar subjects of large size that it is required to be photographed "square-on." The spirit-level will ensure that the sides are perfectly parallel with the upright edges of the plate, but will not by any means ensure that the top and bottom lines of the subject will lie parallel with the top and bottom edges of the plate. A slight want of squareness at top and bottom of the photograph will draw almost as

much adverse attention as leaning uprights would do. One way of ensuring perfect squareness is to take a sight through the middle of the door or gateway on to some other detail that is presumably central with it. This is practicable when there is a passage or roadway leading directly through the subject. That is only a chance circumstance, however, and of course one can level the camera (having got a rough focus) and then slide the rising front up and down so as to observe whether the edge of the kerb and the top line of the subject lie level with the corresponding margins of the screen. The trouble here is that (especially if one is using the ordinary tripod) if the first guess at the right viewpoint is found not correct, one has to level the camera all over again before repeating the test for parallelism. This may be repeated several times with or without final success, the former if one has plenty of patience, the latter if one finally discovers that the kerb slopes slightly or that the pavement is not parallel with the subject!

Much better and quicker is it to buy a threepenny ball of string at the nearest store. The subject is then roughly centered in the camera. No levelling is required at this stage, which is merely to determine the "distance away," and some approach to a guess at the central viewpoint is sufficient. One then ties an end of the string to something on the middle of the camera, either round the lens, or to the front centre of the base. The next thing is to take a line of string to a definite point at one outside extremity of the subject, say, the junction of wall and pavement at the outside corner. Holding the string taut, and taking it over to the corresponding point on the other extreme of the subject, it will be found that the string is either too short or too long. It would be too much to hope for that it would stretch quite equally from either side of the camera, and so signify that the guess was a perfect one (though it is surprising how the string method helps to cultivate an accurate eye)! The thing to notice is approximately how much too short or too long the string is on the second side. The camera should then be moved only *half* that difference. The direction in which to move the camera is *parallel* with the subject but towards the side on which the string shows the distance to be the longer. A repetition of the string measurement is not

at all necessary with large subjects, but with anything in the region of 10 or 12 ft. it may be desirable to check the accuracy of what has been done before finally levelling up the camera. For any subject considerably smaller than 10 ft. in diameter it is better to use the string in the more precise method outlined in the chapter on "Copying," and illustrated in Fig. 85. For square-on photographs of architectural subjects, the method described above will be found quite a sound one, because when the ratio of reduction is as high as it is in such work the degree of "tolerance" as regards the exact viewpoint, is often as much as 12 in., and sometimes even more.

On the other hand, in the case of the lid of a chocolate-box, although it presents precisely the same problem, and is attacked in the same manner, yet the tolerance of error must be kept definitely within a sixteenth of an inch! That is, if the design is to be reproduced for any purpose but that of mere record.

I am prepared to maintain that the average photographer's copying outfit is not up to that standard of accuracy. A really good vertical copier should do it, but a home-made contrivance should be specially "tuned-up" in the following manner, in order to ensure a perfectly rectangular result from the box-lid. Incidentally, such a "tune-up" will probably reveal quite a number of aberrations that may explain other matters that have proved a source of annoyance in the past. First, the easel should be levelled in both directions so that the box-lid itself may not be askew in the slightest degree. Then the camera should be adjusted truly as regards its front panel. Errors here can be detected either by the use of the spirit-level or by means of a piece of stiff cardboard, cut perfectly parallel, and placed with one edge against the easel. Sliding the camera up to the other edge of the card will very forcibly proclaim any lack of parallelism between camera front and easel in either direction. When the front has been seen to, the back needs accurate levelling also, but it must be remembered that the back, though the last item, is the more important. If the plate-back is not square with the easel, no copy ever will be. Any inaccuracy of the front will affect only the definition, not the squareity, of the result.

When such a box-lid or other small object, such as that shown in Fig. 93, has to be photographed "on the bench," it should be fixed in the centre of a large board, and treated as a "small original," as described and illustrated in Fig. 86, Chapter XVI, on "Copying."

Tiny Sizes.

While on the subject of small copies, for which great accuracy of adjustment is required, attention may well be



FIG. 93. TO PHOTOGRAPH ACCURATELY SQUARE ON A SMALL SUBJECT LIKE THIS, SEE PAGE 235 AND ALSO FIG. 86

called to the instance of a small trade-mark or book-plate design, which is to be printed in a tiny but definite size. It is my own fairly frequent experience to be asked for a design to be reduced to, say, $\frac{1}{16}$ of an inch, and even $\frac{1}{32}$! In an ordinary camera it is almost impossible to measure accurately dimensions of this kind owing to the space between the image and the measuring instrument taken up by the glass of the focusing-screen. With the system of copying by enlarger it is easy to make scratches on a waste negative of the desired dimension and to focus these clearly-seen marks on to the original. In either method, however, the way to get these small measurements right is to focus on marks which represent a definite multiple of the original to a similar multiple

of the size required. For instance, it is quite easy to lay a small original upon a sheet of white paper, and to mark in black pencil two (or with extra small designs, three) diameters of it. It is then far easier to secure accuracy because instead of getting, say, a 2-in. detail to a 1-in. negative, one focuses a 6-in. pencil mark down to 3 in., which is the same proportion. It will be clear that any "tolerance" or inaccuracy due to human frailty or the thickness of pencil marks would be the same in either case. But that amount of error in the second method would result in only a third of the inaccuracy on the essential item. Thus, if one got the 6 in. down to 3 in. with an error of the thickness of a pencil mark $\frac{1}{4}$ of an inch wide, the actual inaccuracy on the design itself would be only just under $\frac{1}{8}$ of an inch, which is pretty good going! And it would be quite easily achieved, too, provided the size of the imago is checked in the course of focusing, by means of a pair of dividers set to the required dimension. Either on the ground-glass, or on the enlarging easel, dividers are easier to use than a ruler.

Maps and Plans.

A far more important type of precision work is the reproduction of plans, maps, or diagrams from which measurements have eventually to be taken, and so is the somewhat (photographically) cognate matter of copying similar matter, or letterpress, for subsequent enlargement to a considerable degree.

I propose first to explain why the commercial photographer is at a disadvantage in tackling such work, and secondly to illustrate exactly the effects that he may expect from slight misadjustments, or from unsuitable apparatus. By concentrating on the weak points of his apparatus and usual methods, it will be plain how far he can go to avoid the various important consequences of apparently slight errors.

For exemplifying this I have chosen, not an extreme case at all, but one which is quite a simple and frequent occurrence, and which is as mild a job of the kind that could be selected for the purpose, namely, a 12×10 in. original from which a 15×12 in. print is required. This, it will be agreed, sounds an ordinary enough job! The diagrams Figs. 94A-94E show first the ideal method, by means of a process camera, and

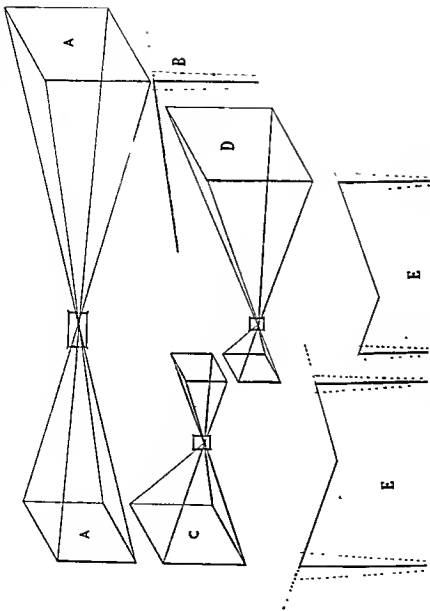


FIG. 91. SCALE DIAGRAM OF COPYING $12^{\circ} \times 10^{\circ}$ TO $15^{\circ} \times 12^{\circ}$
BY DIRECT AND INDIRECT METHODS

then the method of making a half-plate negative with a 6-in. lens, subsequently enlarging from the latter with the same 6-in. lens up to 15×12 in. The photographic prints (Fig. 93) show sections of the results of these methods, although actually the lens used was one of longer focal length, and one that has been especially selected for its proved prowess in copying, and therefore the result of errors should appear less than if an ordinary 6-in. lens had been used. Finally, I show (and will describe when I cannot show) what happens when it is required to make a 3-ft. enlargement of such a subject. It will then be obvious that what is perfectly suitable and reasonable when portraits and views are in hand can be hopelessly inefficient for quite ordinary commercial reproduction work.

Direct Reproduction.

Copying a 12×10 in. to 15×12 in. (or to be really precise, to $15 \times 12\frac{1}{2}$ in.) is simply enlarging by 25 per cent, which is a very slight degree of enlargement indeed. Fig. 94A shows, in isometric projection and in exactly correct scale, what happens when this is done direct on to a large plate in a process camera using an 18-in. lens. The distance from original to plate is over 9 ft., and the apparatus is not only costly in itself, but occupies a lot of space, and large plates are not cheap either. It affords the best way of doing the work, if there is much of that particular kind to be had. Reference to Fig. 94B shows the angle of the light-beam from lens to the extreme corner of the plate, by the dotted lines in which it will be seen that a slight error in construction, which throws a corner slightly forward or backward, will not affect the result appreciably although it is in process cameras that such errors are least to be expected!

Indirect Reproduction.

The commercial photographer's methods will usually consist, for such work, in making a half-plate copy negative, and making the large print from the latter by projection in his enlarger. (If the results finally required are larger than 15×12 in., such indirect method is scarcely unavoidable.) Fig. 94C shows, also to exact scale, a 12×10 in. being copied by a 6-in. lens to half-plate, and Fig. 94D shows this plate

being enlarged to 15 in. Fig. 94E, which shows the light-angles on a larger scale, is intended to demonstrate that a slight error in adjustment from absolute squarity of either original, plate, negative, or bromide-paper, will result in corners that are either cut off by the angle of view, or brought in towards the centre, and so showing some of the outside matter. In either case the result will be out of square, and inaccurate to take measurements from. If more than one corner of either of the sixteen is out of truth, one may look for serious discrepancies in the result. Most likely they will not need looking for!

Practical Proof.

The accompanying test photograph (Fig. 95) was actually made under less stringent conditions than the diagram illustrates, because the lens used was not only of longer focal length than 8 in., but it was one specially selected for its virtues in copying. The matter copied is a strip of letterpress from the previous edition of this book (reprinted on page 226). The central diagonal strip is a 25 per cent direct enlargement, which is, of course, quite perfect, and acts as a contrast for the rest. The two, upper and lower, sections were made by reducing and then enlarging in the exact proportions specified in the diagrams, and represent only what happens *right in the very middle* of the 12 × 10 in. and 15 × 12 in. when apparatus or conditions are not perfect.

Bad Illumination.

The top section, in Fig. 95, shows what happens when the light is stronger at one side than at the other. You are asked to note that although the lamps were about 2 ft. from the original, and the latter only represents a 4-in. strip from the centre of the 12 × 10 in., there is a marked difference between the two ends. Not only is the white paper differently reproduced, but the lettering itself is thicker at the part receiving slightly less light.

It is obvious that shading in printing, and so on, could be resorted to to correct this fault on a small copy but could not be on a large map or diagram covered all over with lines and lettering of varying sizes. At neither end does this compare with the central direct strip, and the inference is

is only one thing to learn, that is, to start with a lens at its "name-stop." This is an aperture (approximate) of diameter. Thus the "name-stop" of an "11-in." f/11. The "name-stop" of an "8-in." lens is f/11. At any given camera extension the exposure at its name-stop will be identical. It is rare that a copying, to use any other than the "name-stop" if one stops down, from that, one place, exposure is obviously is only one thing to learn, that is, to start with a lens at its "name-stop." This is an aperture (approximate) of 1 in. diameter. Thus the "name-stop" of an "11-in." lens is f/11. The "name-stop" of an "8-in." lens is f/8, and so on. At any given camera extension the exposure of any lens at its name-stop will be identical. It is rarely necessary, in copying, to use any other than the "name-stop," but if one stops down, from that place, the exposure is obviously

FIG. 95. ACTUAL COPIES MADE DIRECT AS 94A, AND WITH VARIOUS SLIGHT
MALADJUSTMENTS IN INDIRECT METHOD

that for good line copies, if the indirect method is to be used (as it will be in most commercial photographic establishments not specializing in map work), particular attention should be given to securing perfect illumination, both of original in copying and of negative in enlarging.

Apparatus Aberrations.

The lower sections, in Fig. 95, show what happens when, in addition to unevenness of illumination the front and back of the camera are not absolutely parallel. In making the negative of this, the part of the plate containing this bit of letterpress was about $\frac{1}{16}$ in. nearer the lens at one end than at the other. To compensate for this quite slight inaccuracy, the lens was stopped down to $f/22$, and the print was made *in sections*. The print of the dense end was given an exposure many times that for the thin end, but neither can be made perfect. The centre patch of the lower strip is also from a negative made by the "indirect" method, but lighting and camera were correct, and the result is very little inferior to the diagonal direct-reproduction strip. I very much doubt if the difference will be detectable in the reproduction.

I think the above will show that for much work it is practicable to make a small copy negative, and a subsequent enlargement practically as perfect as a direct copy, but if the original is a map, or other matter containing much fine detail, a good copy will only be obtained provided *all* the essential conditions are right.

Greater Degree of Enlargement.

Having shown what happens when the result is only slightly larger than the original, it should be obvious that when still greater enlargement is required there is no room at all for the least lack of care or accuracy. One less obvious point is that if the negative be not perfectly clear of veil, or is the least bit lacking in perfect sharpness of detail, exposure in enlarging from it to really large sizes will be very prolonged, often beyond practical possibility.

There is still another point, connected with this sort of work, which is applicable to many other cases where enlargements from copy negatives are required. Fig. 96 shows, in

The
n col with
T There by
the stop on is

The system consists of
stop value employed,

FIG. 98. ENLARGEMENTS OF LIVE NEGATIVES TO SIX DIAMETERS
showing the necessity for a good lens in copying

the centre, a portion printed from the direct 25 per cent enlarged negative (the diagonal item in the previous example). It is mounted upon an enlargement of itself to six diameters, that is, in the proportion of a half-plate to a 3-ft. enlargement. The good quality of the central enlargement is plain to see, and shows the virtue of securing a good, clean copy negative. Another half-plate negative was made, to exactly the same scale as the first, with another and inferior lens. Although the negative made with the latter lens looked less perfect than the first, a carefully made *contact print* on contrast paper was so crisp that it was indistinguishable to the naked eye from the perfect copy. As soon, however, as an enlargement was made from it, the imperfection of the negative at once became only too plainly revealed. Enlarged to six diameters, to match the centre one, the result is seen in the outer sections of Fig. 96. The difference between these results and the centre section is not only very striking, but it will be noticed that the right-hand piece is even woollier and fainter than the left-hand section. This is because the worse portion is from the outer margin of the enlargement, where the faultiness of the negative is more marked. The cause of this trouble is inherent in the lens used for making the negative, since all three sections were enlarged in the same automatic-focusing apparatus. It is a mixture, probably, of several faults, such as chromatic aberration and astigmatism. The latter is not cured by stopping down the lens used for copying, while the former fault is possibly exaggerated by alteration of the chemical focus as the diaphragm is reduced. This illustration of an actual case goes still more to show the need for particular care in selecting and in testing lenses to be used for such exacting work as making large prints of line subjects. Quite apart from any question of the retention of exact scale when reproducing maps or plans, it is obvious to the last degree that definition of the kind shown in the outer sections of Fig. 96 would be useless to the client for almost any type of subject. Yet the most skilful workmanship or accurate camera would not render a better result with the lens in question, although it is quite a good one for many purposes.

There are, of course, very many kinds of photographic work which call for a much higher grade still of precision,

both as regards the apparatus used, and the methods of using it. There is, for example the making of large sheets of accurately matched negatives for producing cigarette cards, and the photographing through a microscope of minute organisms, fibres, and so on. I have preferred, however, to confine my attention herein to work which is most likely to reach the general practitioner in commercial photography, and to point out just how and where he is likely to meet with difficulties. Knowledge of the causes of these should enable him to prevent them, and so to handle the types of work described with complete confidence

CHAPTER XXII

ESTIMATING COSTS AND CHARGES

MANY photographers adopt the attitude towards this most important subject of Punch's famous advice to those about to marry 'They don't. On the other hand, there is the advice of a much sounder authority on the subject of marriage, which suggests that the would-be Benedict should write down every detail he can possibly think of that will be required for his new home, with their approximate prices. Then he should add them up, and multiply the total by *three*! Allowing for a slight measure of exaggeration, there is a measure of truth in that advice which might well be borne in mind by those who are too liable to make a pot-shot guess at what jobs cost them to do.

With a flat price list, such as the list of minimum prices recommended by the P.P.A., there are bound to be occasions when the cost of operator's actual time occupied in operating, and the cost of the materials used, seem on the face of it, to produce a margin that should permit of substantial "cutting" and still leave quite a handsome profit. Yet one does not find people who adopt such a scale of prices retiring at an early age to a life of pleasure! There are two reasons for this. One is that the time occupied in "taking photographs" is only a small part of the total time that a job takes, and the other is that wages and materials form only part of the cost. Moreover, observation will show that the operator does not by any means spend all his time in actual operating, nor the printer in printing. In establishments where a numerous and organized staff, combined with a regular flow of business, make such continuity possible, it is obvious that there will be other people doing those other things (extra wages), there will be other rooms where they are doing them out of the operators' and the printers' way (extra rent), and there will usually also be the additional cost of obtaining the extra business which makes such things possible. Even then it will be discovered that there are periods when the operator is occupied in travelling, in packing and unpacking his kit,

and in guessing about generally with nasty subjects, or in recording his expenses, etc., etc., etc. The printer similarly will experience many an occasional hiatus in the process of churning out prints. It is to be supposed that somebody has to trim and spot prints, keep the place clean, and answer the telephone. Someone, too, has to write out invoices, and keep the accounts, and talk politely to long-winded clients.

Where the Money Goes.

All these are details of what are called "overhead expenses," and so are rent, rates, telephones, fares, stamps, stationery, light and heat, and all the rest of them. The total cost of these over a period can be ascertained, and divided into short periods of a month, a week, or even an hour of running the show. It will then be plain, not only what it costs to carry on, in addition to man-hours and materials while a man is actually taking photographs, but also the expenses that are running on *while he is not*.

Flat Rate Means Occasional Loss.

Occasions frequently arise when a single photograph has to be taken which seems to present all sorts of obstacles and delays, arising from extraneous circumstances as well as from the inherent technical problems of the job itself. If the cost of time and material in such a case be added to the proportion of "overheads" for the period, it may easily amount on occasion to more than the flat-rate price of the single photograph. That is, of course, a circumstance that is inherent in a flat-rate price list, but the point is that such an occasion, to say nothing of time between jobs (whether spent in the 'bus or in looking through negatives, or in smoking cigarettes), causes an astonishing drop in the average profit.

Where the Profit Goes.

With an average run of ordinary commercial photography at the minimum P.P.A. rates, the average cost of materials is found over a period to be somewhere around 10 per cent of the price of the jobs. Now if we take as a basis a business in which all the other costs (including the owner's salary or "drawings") amount to, say, £4 per day, and a particular

day's operating is found to amount in value to £8, there is a liability for the staff (and, in some cases I have met, for the boss himself) to suppose that he has made £4 profit. Deducting the cost of materials at 10 per cent, there would still, on the face of it, be a profit of £3 4s. The trouble is that the next day the morning's job may be spoilt by rain, and the client for the afternoon may ring up and cancel the appointment. The day may be spent very valuably in overhauling apparatus, in looking up other clients to see if there is anything doing, in arguing with the income tax authority, and the like, but none the less, the previous day's 'profit' of £3 4s. has to go towards paying that day's running cost of £4, leaving a net loss of 16s. on the two days' work!

Speed Increases Cost.

Moreover, the modern craze for maximum speed has definitely increased the cost of producing work. Instead of an operator being able to go directly from one job to the next, he has to see that his negatives are developed immediately, or even to develop them himself. Instead of washing and drying along with others in hatches, the negatives often have to be swabbed off and dried in spirit, which costs money, as so does the time of the persons doing and supervising it. The rush job interrupts the printer, who again has to see that the prints are washed and dried, not with a hatch, but as a separate series of operations. Someone has to switch off what they are doing and attend individually to the finishing and dispatching of those prints by a messenger whose time is taken up in making a special trip, with the same cost in fares as the operator spent in going to take the photographs. All these items, each of them seemingly trivial, tot up heavily in the course of the week, in addition to which it should be noted that no worker can be switched back on to his work after an interruption to resume it as instantly and smoothly as he left off. Photography is not the kind of work on which that can be done without losing either mental or physical energy, with consequent loss of either speed or quality in the work. For all these reasons it is not possible to give clients the same quality of work at increased speed and at the same time to reduce the price. The added

when one is asked to do something rather outside one's previous experience. It may be that experimenting in new fields is a pleasant experience, but that is no reason why the customer should be the only one to reap a material benefit.

In another case, again, I was asked if I could make photographs of a furnace which could not be looked at with the naked eye, to illustrate some irregularity in the burning coal.



FIG. 97. MINUTE FRAGMENTS OF STONE, EXTRACTED FROM USED MOTOR-OIL, TO ILLUSTRATE THE DANGER TO THE ENGINE FROM OIL WHICH IS NOT CHANGED WITH REASONABLE FREQUENCY
Photographed by low-power micrography

Some other photographers, I was told, had declared it to be impossible, so that it seemed to be expected I should spontaneously accept the challenge. It may usefully be added that I did so on the condition that the preliminary experiments to obtain the necessary data should be paid for, even though they only proved the people previously consulted to be correct, in that results should not be forthcoming. However, the tests, made by various exposures upon various kinds of plates, proved so promising that over fifty photographs of various stages of the faulty burning were subsequently made at one "sitting." Three of these are illustrated (Fig. 2).

This is stated to show that if the cost of the preliminary tests had not been guaranteed, on the one hand, I stood a good chance of being at a loss, while on the other hand the satisfaction of the final success would have been considerably reduced by the previous unremunerative expense.

"What to charge" is always a vexed question. In commercial photography there are many grades of quality, and



FIG. 98. NOT A ROCK RISING FROM THE SEA, BUT MERELY A CONGLOMERATION OF GRIT, METAL, MICA, AND CARBON, FOUND IN OIL TAKEN FROM A MOTOR CRANKCASE.

Photographed by low-power photo-micrography, with background and lighting arranged to produce a striking effect

to some extent prices are regulated by the amount of work of one kind that can be obtained.

If one specializes in a particular branch of work that can be handled in a routine manner, or, in other words, upon more or less factory lines, and if the requirements of clients are such that orders can be executed in sufficiently large batches as to permit of such methodical treatment, it follows that the costs of production are very much lower than in the case of a "general practitioner." By this term is meant, of course, a photographer who accepts any and every kind of order, and whose work involves a lot of interviewing,

travelling, packing and unpacking of kits, and who often spends thus a considerable amount of time in the aggregate upon the production of each photograph.

It must be pointed out most emphatically that in the vast majority of commercial photographs the actual time spent in "taking," that is to say in manipulating the camera, and the amount of *cash* involved in the plates exposed, represent a very small proportion indeed of the actual cost of production.

Almost the only exceptions to this rule are such occupations as quantity printing or copying, in which material in bulk is rapidly passed through processes, many of which are done by practically unskilled labour, so that materials form the principal item of cost.

Prices to be charged depend to a very great extent upon the cost of production. Obviously, the price of a photograph consists of but two items, viz. cost and profit. The amount of the profit is to some extent regulated by the photographer himself, but the cost is not so easily controllable, and consists of a large number of items, many of which are not easily remembered or calculated excepting by keeping proper accounts, and having them balanced periodically.

It is not all easy, therefore, for any writer to attempt even to outline a scale of charges. If the reader is a member of the Professional Photographers' Association, he will be already in possession of a list of suggested charges for commercial photography based upon averages of existing price lists, and this is a very useful guide to start with.

How to Estimate Costs.

It is, however, a very enlightening and useful thing to sit down and spend an hour or two in careful calculation, first of the totals of all regular items of expenditure over a period, including such details as rent and rates, insurances, wages, not forgetting even such necessary details as office cleaning and technical journals. This regular expenditure is called "overhead" expense. When the list has been made and every possible item of expenditure entered, it is not a bad plan to put it by while another side of the question is taken up, for additional details of expense for inclusion in the list are sure to come to mind in the meantime. When a business

is conducted from a private house a proportion of the rent, etc., is an "overhead charge" of the business.

Cost of a Job Depends Largely on the Time it Takes.

The next thing is to pick out a few examples of the kind of work one proposes to do. Then to estimate as far as one can, from such evidence as may be available, how many of such jobs one can carry out in, say, a day, or a week; not in specially favourable conditions, but taking the rough with the smooth. In other words, remembering that one job may mean half an hour's walk and an hour's struggle for just one picture, while just round the corner one may "fall on velvet" and "shoot" half a dozen subjects in much less time. It is obvious that an estimate obtained in this way may be well away from what will actually occur in any given period, but it is infinitely less inaccurate than pure guesswork, and average time for jobs based on an estimate of this kind is a much better guide when working out a quotation than a guess at the length of time likely to be taken in the operating only.

As has already been pointed out, the actual time spent in operating is a small part of the total work. Therefore it is not so important to know how many plates can be fired off in a given time as *how many photographs can be produced completely* in that period, which is a distinction with a very great difference. For instance—

How the Time Goes.

A photographer of prize stock has perhaps some distance to go, and knows that not more than one animal at a time will be brought out. There is no hurrying prize cattle; and the coaxing some of them need before all four feet, as well as head and ears and tail, are right!

And so on, and so on, and so on. It must be noted also that even while loading slides, waiting for the bus, and developing plates, making up solutions, and packing prints for the post, the clock is still going round. Therefore let it be repeated that an average should be worked out, if only a rough one, of how many outdoor photographs, or how many indoor ones, can be carried through and delivered in a period.

By the methods described one soon arrives at two very important conclusions. First, one has a sufficiently correct record of overhead expenses from which (by dividing the total sum by the number of working days in the period taken) one obtains the cost of "running the show" for a day. Next, one has a fairly definite idea (instead of a mere surmise) as to how long it will take to make a set of negatives and prints from them, including all the innumerable operations incidental thereto. So that it becomes possible to say pretty correctly how much of the running costs go to a job according to the time it takes.

It is very often forgotten that running costs do not cease to exist merely because one is working away from one's base. If anyone doubts whether he should add the due proportion of "overheads" when estimating for an outdoor job, let him ask his landlord to excuse payment of rent for the time he is away!

In a "one-man show" everything the proprietor does is overshadowed by the cost of "overheads." That is to say, if the rent, insurances, and all the other incidental expenses, called "overheads," cost a pound a day, and his own salary as head operator is the same, the cost of an hour of his time, on the eight-hour basis, is five shillings exactly. If he tarry for half an hour to discuss the weather with a client, it will cost him exactly half a crown additional to the price of the drinks. If he thinks that he will "save" by doing his own dish-washing and trimming of prints, let him remember that it costs him five shillings an hour for the time spent in such occupations.

Whereas a lad at ten shillings a week costs but a little more than twopence per hour for time, while the "overheads" are divided among two workers. While the lad is doing the unskilled routine work therefore, the operator can be making more photographs or performing the duties of advertising-manager in the intervals. The total cost of his own time per hour is reduced by 25 per cent while the apprentice will surely be able to cover his total cost of eighteenpence per hour (wages 2½d., overheads 1s. 3d.).

Thus a one-man business is only an "economic" possibility where the work is of a kind that returns prices above the average, with a comparatively low proportion of expenses

To return to the question of calculating costs. It has been shown that the cost of a job includes—

Overhead costs per hour while photographing (which includes preparation, travelling time, etc.).

Operator's salary for the same period, i.e. from the time he starts to get ready to the time he leaves the developed negatives.

Cost of plates used, including duplicates.

Developer, etc., practically negligible, say a penny per negative.

Then there will be the following—

Time spent in printing.

Paper used.

Chemicals (say 10 per cent of the paper cost).

Overhead cost of time occupied in printing.

Now comes a pitfall. If operations be carefully timed now and then, it will be found that the work involved in fixing, washing, laying out to dry, trimming, sorting, and packing up of prints, to say nothing of checking them by the orders and subsequent indexing away of negatives, consumes a far greater amount of time than the actual printing operations. These minor operations are so often left out of consideration, merely because *they are unskilled and unimportant*. It is the *time taken* over the work that costs the money.

It is very instructive indeed actually to time a few batches so that one has a pretty clear idea of how long each stage of an order really does take to get through.

When these various times are known, the cost of a job per hour in wages is easily ascertained, the overhead charges per hour are added, and then the cost of materials, leaving a reasonable margin for wastage. The result is the actual cost of producing the finished photographs.

A Practical Example.

For instance—

Estimate for going out to take three whole-plate photographs and supply proofs and 100 prints from one subject.

Time estimated for travelling, operating, returning, and developing, X hours, operator at Y/Z per hour.

Fares

Plates, including duplicates

(If specially dried off, cost of spirit and time to be added)

Proofs time in printing, etc., say 1 hour at per hour

Paper, including wastage

Envelope and postage

100 prints—

100 sheets, plus wastage

Chemicals, say 10 per cent of above

Time printing hrs at

Boy fixing, washing, etc., trimming, hrs at

Packing and postage

Total of hours occupied, overhead charges at per hour

Total cost of production

Profit required

Price to be quoted

After a business has been running for a year or two the actual overhead charges are more easily ascertainable if the accounts have been kept up to date by a professional accountant.

The above procedure is quite easily applied if one is able to make a note occasionally of times actually taken over jobs and check the prices charged, so as to determine whether the margin of profit is satisfactory or even whether it exists.

That a very large amount of commercial photography is executed at an actual loss is an unfortunate fact. On the one hand, there are firms whose "commercial photographic department" is a mere side line, and who are more concerned with the convenience of having a technical man at hand than with the small profit or loss he may make; often, probably, they do not take the trouble to calculate what the real costs are. On the other hand, there are practitioners who make no profit at all, and who seem satisfied if their own salaries as operator-manager are substantially less than they could earn without having the responsibilities of a business upon their shoulders.

Undoubtedly no man should start "on his own" unless he is sufficiently enthusiastic to work hard and long. This sacrifice, however, should be for his own ultimate benefit.

His clients will be satisfied with good work at a reasonable price. He need not charge such prices that he *must* work a twelve-hour day, and still have to use second-rate material to leave sufficient margin for bare existence. Rather let him endeavour to produce something a bit *better* than the other man ; something that will be *worth more*.

To instil into one's work the spirit of good craftsmanship ; to try to produce something a little bit better each time ; to make people exclaim " How good," rather than let them grudgingly admit " Well, it's cheap," helps to make life worth living. Otherwise the great proportion of one's conscious life that consists of working hours might more profitably and happily be occupied in sweeping roads, or in adding up " tots " !

CHAPTER XXIII

RECORDS AND ACCOUNTS

Reducing Clerical Work to a Minimum.

WHATEVER the business done, even upon the smallest scale, some record must be kept of orders in hand. Even after the work has been delivered and paid for (two events not necessarily synchronous) it is rather disconcerting when a client asks for some prints or enlargements "as last," if one has no details readily available to refer to for particulars of the work done or the price charged. In commercial work credit accounts are always more numerous than cash payment, the latter being rare indeed, so that proper records are essential.

Since also jobs vary greatly as to the period they are in hand, from two or three hours to as many months, a day-book of the ordinary kind will soon become congested with details of finished work, among which it takes some time and effort to find the entry of any one uncompleted order. For this reason the writer has devised the following simple card method of recording work in hand. It affords the greatest freedom from clerical work than any system he has found yet. This alone should recommend it, since there is quite enough already in modern life of filling in facts and figures upon forms. The principal feature of the method is that only "live" cards are under observation. That is to say, the operator or printer has under his immediate notice only cards referring to work in hand; while equally available, and similarly undiluted, are cards referring to orders which have been completed, but require charging to the customer and entering in the more formal journal and ledger.

Why Proper Books Must be Kept.

It is essential nowadays to keep proper books, on the one hand to satisfy a possibly unduly exacting tax-officer, and equally on the other a probably suspicious purchaser of the business, should disposal be desired. There is always the possibility that some specially remunerative branch may be

developed to a stage that takes up so much of one's time and energies that it would be quite legitimate to sell the regular routine business ; but in the absence of clearly kept books a satisfactory price would be difficult to secure. Besides this a knowledge of "how one stands," either generally or with a particular creditor or client, can always, and *only*, be obtained from properly kept accounts.

The entering of details in the system to be described is easy and simple. The more difficult parts of the book-keeping work can usually be handed over to a professional accountant to be completed in return for a moderate fee.

As soon as an order is received, or for the matter of that as soon as it is "smelt," a card 5×3 is headed with the client's name and the date. If no exact details of the work to be done are known, the card serves at any rate as a reminder. In any case, only essentials are written. Addresses are kept in the ledger and telephone directory, etc., so there is no need to write these details every time one gets a repeat order. In the case of firms for whom some negatives are made in their own works, and who send other details to the studio, involving differing scales of charges, distinction is made simply by the words "at works" in the former case, upon the job card.

Times of appointments similarly are out of place on a works record, crowding up space, and the right place for such reminders is a diary, either in one's pocket or upon the desk. More important still is the total omission of unwanted words and figures. In the writer's works sizes are written in terms of the long side of a finished print, thus : 4", 6", 8", or 12". This not only is clearer and simpler to write on cards and invoices than both dimensions, but saves the possibility of argument if the subject happens to necessitate a delivery of panel-shaped prints.

As soon as photographs are taken the operator writes details of what has been done upon the card. He does *not* write, for example—

1 12" \times 10" negative of Daimler car,
but simply—

1 12" Daimler,
which conveys as much.

Invoices naturally are more fully detailed, choosing

language that *the client can understand*. It seems probable that delays in paying accounts that are not clearly comprehensible is due as often to mere disinclination to unravel puzzles as to financial depravity. It will be noticed on

Phoenix Notes 16 2 25

FIRST STAGE

As soon as an inquiry or order is received, a card is headed and instructions given to operator

Phoenix Notes 16 2 25

1 12" Brunlee

1 8" Hat

2 8" Repair Shop

SECOND STAGE

He records particulars of what he does. Also, if he knows, what prints are required. Note that this card indicates two different views of repair shop. If more than one print is required from a negative, it is recorded as shown on the next card

reference to the illustrations that all making of negatives starts at the left-hand margin of the card. That is to say, that any figure on the left margin means "so many new negatives made of" and nothing else. Next comes the size, and about 1½ in. inset are all other details.

By thus tabulating details it becomes easy to recognize at a glance which are the cards that refer to new negatives as

they come from the drying racks. In a large office, of course, the columns would be printed, with headings. Since the charge for taking a negative includes one print, in most commercial work entry of additional prints or any

<i>Phoenix Motor</i>		<i>16 3 35</i>
<i>1</i>	<i>12" Drumler</i>	
	<i>Painting out</i>	
	<i>3 extra p/s 12"</i>	
<i>1</i>	<i>8" Hat</i>	
<i>2</i>	<i>8" Repair Shop</i>	
	<i>2 blocks</i>	

THIRD STAGE

The detailed requirements becoming known, are entered thus. The printer now knows exactly what to do. The goods are sent home and the negatives pass automatically

<i>Phoenix Motor</i>		<i>16 3 35</i>
<i>1</i>	<i>12" Drumler</i>	<i>4216</i>
	<i>Painting out</i>	<i>5640</i>
	<i>3 extra p/s 12"</i>	
<i>1</i>	<i>8" Hat</i>	<i>5641</i>
<i>2</i>	<i>8" Repair Shop</i>	<i>5642-3</i>
	<i>2 blocks</i>	<i>none</i>

FOURTH STAGE

to be filed, when the assistant takes the "finished" cards along with him, "dots" them (see page 291), and enters the negative numbers upon the card. He then deposits the cards at the back of the "finished" box

other work is placed upon a new line, by whoever received the order. Sometimes the operator gets these instructions while on the job, and sometimes it is pre-arranged. If negatives receive numbers, as in the case of clients who are likely to re-order, these are written upon the cards, in very small figures, against the various details at the same time as upon the negatives.

"Dotting"—Its Important Purposes.

As soon as negatives are printed from they are placed in a separate pigeon-hole, from which they are taken, in batches, to be filed away. The assistant who does this filing has it very thoroughly impressed upon him that he must place a dot, upon the card referring to that job, against the figure showing how many negatives were taken of the subject. The time he makes the dot is *immediately* he places each negative, or set of negatives, in the storage box, and *before* he touches any others.

This simple bit of procedure serves two very important

<i>Phenon. Photos</i>			16	9	35
1	12" Sample	0724	1	1	0
	Painting out	3.46		4	6
	2 on 12" 12"			7	6
1	8" Hat	5661		12	4
2	8" Kipure top	5642-2	1	5	2
	2 blocks	min		1	5
				4	16

FIFTH STAGE

The manager prices the details, the totals only being entered in the Journal, and the page number of this book is jotted in the top corner of the job card

purposes. Firstly, it prevents any negatives being stored away before being printed from or being mislaid for any but a very brief period, because if the assistant finds an entry on any of the cards which are handed to him as finished orders, for which he has no negative, obviously he makes no dot, and either puts the card back among the uncompleted orders, or if he has any doubts upon the matter he sets about making inquiries right away, before time complicates the error.

The second, and even more important purpose of the dot is that if the assistant has one or more negatives to file away for which he can find no entry on a card, and therefore cannot "dot," he straightway makes inquiries as to where the card may be. Either case is equally rare, and in the event of his having negatives for which no card exists it is

found usually that the job was a rush one, perhaps as the result of a 'phone call. In the hurry of executing such an order, perhaps breaking into the evening or into a week-end, an operator may satisfy the client, but forget to enter up the job on a card, in the absence of which no invoice would automatically follow the prints. "Dotting" is an absolute check against such a thing occurring.

Even in the case of reprint orders, no negatives are refiled without this precaution. In the case of negatives being blocked out, a record is made by the retoucher upon

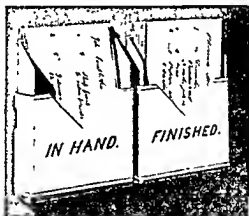


FIG. 99. WORKROOM RECORDS

A pair of quarter-plate boxes form an effective card-index for orders in hand

each negative of the total time spent upon it. When filing away negatives, in addition to making the "dot," and to entering upon cards the numbers given to negatives, it is not easy for an assistant to miss seeing *both* the instructions on the card *and* the red paint on the plate, so he takes the opportunity of filling in the time taken for each upon the card, taking the figures as marked on the negative.

The cards themselves are kept in two boxes as illustrated, in the printing room. The total costs involved in installing this very efficient little system consists of a few shillings for a thousand 5×3 index cards, and a few minutes of a boy's time to fix upon the wall a couple of empty quarter-plate boxes, cut as seen in the photograph.

As soon as a set of prints has been made, the card

referring to the job is picked out of the first box and is placed in the next one. When the prints are finished and sent home, the card is again lifted out and replaced behind a stout card partition. Thus instead of *writing* upon each card (which process experience shows is so often neglected in photographic establishments) the transference of a card from one place to another indicates to the person interested just how the work stands, and there are never more than the fewest possible cards to be looked through in any one place or stage.

When it comes to making out invoices, only those cards behind the "finished" partition are taken out and prices filled in. At the same time as writing the invoice an entry is made in the "Journal," or Daybook, but since one has already got all details upon the cards, nothing more is written in the book than the date, name of customer, and the total price of the job, in one line. A customer who has several jobs done, about the same time, will be entered as shown on the following page, while a single item is written in the second (right-hand) column only.

Upon each card, as soon as the total amount is entered in the Journal, is written the "folio" or page number of the latter. This may be done conveniently on one of the two top corners, provided that the same be adhered to throughout. It may be added that the back of the card is always available for such details as fares expended, time taken, and so on, that may be required if prices should be queried at a subsequent date.

The advantage of keeping a Journal in the manner shown is that it is possible to see at a glance which clients are the ones most worth studying, and by adding up the right-hand column the total business done each month.

The "Ledger" is a record of money owing and paid, both ways.

On the last day of each month the total of a client's invoices, as shown in the last column of the journal against his name, is written in the ledger upon a page, called a "folio," allotted to him. An alphabetical index at the beginning of the ledger will make it easy to find any client's folio. When "entering up" the ledger, the folio number of the journal, that is to say the number of the page upon which that item appears, is written in the little column

provided for it against the cash columns. Again, at the same time, the folio number of the ledger is jotted down in a similar column against the item in the journal which is being "transferred."

The cards for which invoices have been sent are stacked away in boxes. They should stand on edge between taller cards marked with names of the months. Naturally it

Folio or Page of Journal

49

March 1935

Mar			97	4	16	2			
-	16	Phoenix Motors							
-	19			3	4	2			
-	21			1	1	6	9	1	10
-	21	Ford Foods Ltd.						1	1 0
-	22	Buildem Brick Co.						3	19 6

does not take more than a few minutes at the end of a month to sort out the cards belonging to each client, and then each little pile into order of dates, before putting the pack for the month away. It is found quite quick and easy, if this method is followed out, to find details of any job that one may wish to look up, since any one entry provides references to the others.

As each account is paid, the cheque is sent to the bank, and on the counterfoil of the paying-in book is jotted the name of the firm from whom the cheque was received. At regular intervals the ledger is made up to date by finding

rendered. If a practice can be made of sending out all statements on the last day of each month it is all to the good, since that complies with all requirements, whether they be for the first or the fifteenth of the month. Those customers whose cheque is received on the first of the month, for a statement posted to reach them on the first of the previous month should be particularly well nursed. If payment is delayed for another fortnight, no suspicion of ill feeling should be permitted to develop, since the routine of many firms comprises payment about the middle of the month; while failure to post a statement till the first week of a month has elapsed is liable, in many organizations, to postpone even its examination till the proper season comes round again.

Unless one is *persona grata* with the clerical staff of a large business, it is about as much use quarrelling with red tape as it is in the Army. As one develops one's own business so does one adopt a similar routine for dealing with payments. A photographer does not rush out to post a cheque immediately he receives each demand from his stock houses, but, on the other hand, he will file his statements and will, whenever possible, pay all such accounts in a batch, just before the fifteenth of each month; that date being the one adopted almost universally by the wholesale photographic trade in this country as a limit for the $2\frac{1}{2}$ per cent "settlement" discount. However small each amount saved by prompt payment, it should be remembered that over a year the total can pay for some much needed article, and that taking a discount of $2\frac{1}{2}$ per cent for a month's dues is actually equal to receiving interest at the rate of 30 per cent per annum! Not a bad return for making payments a few days earlier than one really need!

The entries of goods bought are made in precisely the same manner, but many will prefer to hand over checked invoices and receipts, say once a month, to a professional accountant. The same man will, for a reasonable fee, check and complete the various books, and make up a "balance sheet" say every half-year. If the photographer has not the kind of mentality that understands such documents in the form usual among accountants, a competent man can usually be persuaded to depart from traditional to frame his information in a manner intelligible to the lay mind.

INDEX

ACTION photographs, 182

Annuals, 207

Are lamp, 69

BACKGROUNDS, 73

—, changing, 258

—, ground glass, 159

—, various objects, 248

—, white, reflections, 167

Banquets, swing front, 46

Black objects, relief in, 144

Bleach-out prints, 112

Blocking out backgrounds, 250

—, lighting that aids, 170

Book-keeping, 200

Boxes, objects in, 155

—, lens for, 163

Bracket camera holder, 60

CAMERA, choice of type, 12

—, hand, uses, 10

—, legal photography, 202

—, movements, 33

—, required features, 11

—, squaring with original, 233

—, studio, 71

—, taper bellows, 45

—, vertical, 73

—, wide angle, 14

Carrier, dark-slide, 35, 72

Case for outfit, 66

Changing bag, 55

Charges, fixing, 278

Chemicals, keeping, 82

Chloro-bromide papers, 105

Chocolate in boxes, 155

Cine films, prints from, 247

Cleaning prints for copying, 225

Clouds, introducing, 256

Colour, contrast, increasing, 150

Coloured line originals, copying, 220

Colours, on ordinary plate, 151

Combination photographing, 156

—, printing, 254

Copying, 213

—, away from studio, 231

—, bracket camera holder, 61

—, maps and plans, 269

—, process lens, 23

—, reflex, 237

—, ultra small, 268

Copying with enlarger, 230

Corner subject, lens for, 163

Corners, supporting camera, 124

Costs, estimating, 278

Cracked photographs, copying, 223

Cut-off, lenses, 57

DARK-ROOM, lighting, 91

Dark slides, correcting, 63

Developers, compounding, 87

Diagram lantern slides, 243

Drying prints, 99

—, —, for bleach out, 114

ELECTRIC supply, 68

Embroidery, process plates, 150

Enlargers, condenser, 96

—, lenses, 20

—, shading fitment, 107

—, short-focus lens, 10

—, vertical and horizontal, 95

Exposure, in copying, 226

—, meters, 61

Extension box, camera, 14

—, —, as carrying case, 66

Eyes, flashlight photographs, 134

FADED photographs, copying, 223

Falling front, camera, 35

Filters for colour rendering, 152

—, rule of action, 154

Fireside groups, setting camera, 40

Fixing baths, making up, 88

—, —, using, 89

—, prints, test, 95

Flanges for lenses, 51

Flash bulbs, 136

Flashlight powders, etc., 132

—, groups, 134

—, reflections, 133

Flower beds, use of rising front, 43

Focusing cloth, 59

—, magnifier, 58

—, screens, 58

Foreground, reflections from, 173

Furniture, side swing, 47

—, studio accessories, 78

—, use of rising front, 43

—, white background, 167

Furs, lighting, 77

GARDEN views, setting camera, 45
 Gas-filled lamps, 70
 Glazing prints, 100
 Glass, objects under, 177
 Glassware, lighting, 179
 Ground glass as background, 159
 ———, varieties, 58
 Groups, small objects, 142
 ———, swing front, 46

HALATION and wide angle, 26
 ———, causes, 119
 Half tone, prints for, 117
 Half-tones, copying, 229
 Hands, posing, 188
 Hats, supporting, 160
 Houses, side swing, 47

INTEREST in photographs, 192
 Interiors, camera against wall, 62
 ———, legal photography, 204
 ———, lenses, 120
 ———, localized lighting, 125
 ———, mirror for focusing, 68
 ———, rising front, 43
 ———, view point, 122
 ———, wide-angle lens, 29
 Iodine-cyanide bleach, 113
 Iris lens holder, 63

LAMPS, gas filled, 70
 Lantern slides, 230
 Leaning subjects, photographing, 203
 Legal photography, 198
 Lenses, animal subjects, 210
 ———, equipment required, 20
 ———, hoods, 57
 ———, interchanging, 61
 ———, interiors, 120
 ———, iris holder, 63
 ———, panels, 52
 ———, small objects, 162
 ———, studio use, 72, 76
 ———, testing, 30
 ———, tray for carrying, 66
 ———, wide angle and halation, 26
 Lettering, adding to photograph, 234
 ———, showing in relief, 146
 Level, spirit, 61, 123
 Lighting, studio, 68
 ——— systems, 69
 Line drawings, copying, 219
 ———, developers, 104
 ———, from photographs (bleach out), 112

Low view-point, setting camera, 41

MACHINES, operatives at, 191
 Maps, copying, 269
 Materials, cost, 279
 Mercury vapour lamps, 71
 Metal foil, showcards, 178
 ——— objects, relief in, 146
 Metol-hydroquinone developer, temperature, 104
 Mirror, reflector in studio, 175
 Models, keeping still, 149
 Motor accidents, 199
 Mouldings, process plates, 150
 NEGATIVES, filing, 294
 ———, sorting for printing, 107
 Northlight arc, 68

ORDOVERAX process, 237

PAINTINGS, copying, 220, 232
 Panchromatics, and reflections, 166
 ———, uses, 80
 Papers, printing, choice, 80
 ———, ———, checking stock, 84
 ———, ———, odd sizes, 82
 Perspective, modifying, 48
 ———, small objects, 162
 Photo montage, 262
 Photostat, copying, 236
 Pins, holding small objects, 159
 Plans, copying, 269
 Plates, checking stock, 84
 Playertype copying, 237
 Polished objects, dulling, 175
 ———, reflections, 166
 Precision work, 263
 Printing, box, 93
 ———, test exposures, 108
 Putty dulling polish, 175

RED ink marks, omitting in copy, 224
 Reflections, flashlight, 133
 ———, shop windows, etc., 164
 Reflectors, masking part, 149
 Reflex copying, 237
 Relief photographs of small objects, 144
 Reproduction, prints for, 116
 Reversing back, mask for, 57
 Rising front, interiors, 43
 ———, studio use, 41
 SCRATCHES, lighting to minimize, 175

- Shading, in enlarging, 107
 —, negatives in printing, 94
 Shadowless photographs, 158
 Shop windows, falling front, 39
 — —, night, 130
 — —, reflections, 164
 Showcards, metal foil, 178
 Shutters, 55
 Side swing, uses, 38, 47
 Small copies, making, 268
 — objects, lenses, etc., 77, 137, 162
 Soap, process plates, 150
 Solutions, making, 86
 Spectacles, flashlight photographs, 134
 Spots caused in printing, 112
 Squaring camera with original, 233, 263
 Stands, camera, 31
 — —, anti-slip fitting, 54
 — —, bracket, 60
 — —, one-leg, 62
 Stock, plates, etc., checking, 84
 Storage, negatives, 294
 —, sensitive materials, 81
 Story, in photograph, 187
 Streets, bracket camera holder, 61
 Studio, size, etc., 67
 Sulphide toning, fixing prints, 89
 — —, lantern slides, 244
 Surgical instruments in cases, 156
 Swing back, 36
 — front, uses, 37, 45
- TABLE displays, swing front, 46
 Telephoto lens, uses, 24
 Temperature, developers, etc., 89, 92
 Titles on photographs, 253
 Tops of objects, showing, 41, 141
 Tram lines, level in road, 200
 Tripod (*see* Stand)
 True-to-scale copying process, 237
 Tunnel, lighting polished objects, 176
- Uprights in subject, setting camera, 39, 264
 —, interiors, 123
- VERTICAL camera bracket, 73
 View-finder, wide-angle camera, 16
 Voltmeter, 69
- WARM-TONE papers, 103
 Washing prints, 98
 Weights, sheet lead, 86
 White objects, process plates, 149
 Wide angle and halation, 26
 — — camera, 14
 — —, supporting against wall, 62
 Wooden objects, showing relief, 146
 Work-bench photographs, 190
- YELLOWED prints, copying, 222

PUBLISHED BY PITMAN



STUDIO PORTRAIT LIGHTING

By

HERBERT LAMBERT, F.R.P.S.

A valuable work by a well known portrait photographer. Its object is to make a study of lighting as it may be applied to portrait photography in the studio, with special reference to the management of various forms of lighting. An important feature of the work is the number of beautifully reproduced illustrations of the author's own work, each of which

is accompanied by diagrams showing the method adopted to obtain the different effects. The book is of great interest to the professional, to the serious amateur, and to the progressive portrait photographer, who is eager to improve his standard of studio production.

ABRIDGED CONTENTS.—INTRODUCTION—TRADITIONS OF PORTRAITURE—THE THEORY OF TONE PRODUCTION—PRINCIPLES OF LIGHTING—THE ARC LAMP FOR STUDIO PORTRAITURE—THE GAS-FILLED LAMP—THE MERCURY VAPOUR LAMP—ARRANGEMENT OF THE STUDIO.

92 pp.

15s. net

Fully Illustrated

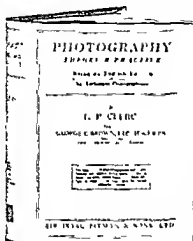
PRESS OPINIONS

"Treats this important subject in a comprehensive and practical way . . . Mr. Herbert Lambert is widely known to professional photographers whose work for many years past, as shown at leading exhibitions, has been marked equally by individual artistry and by the highest degree of technical quality . . . There is probably no one so well qualified to be the author of a work on this subject . . . The book is a contribution towards better portrait photography, which, we are sure, professional photographers will welcome."—BRITISH JOURNAL OF PHOTOGRAPHY.

"The portrait photographer who wants to improve his work, or the commercial man who is anxious to know more about portraiture for use in model work, will both find this book worth the money."—COMMERCIAL PHOTOGRAPHY.

Sir Isaac Pitman & Sons, Ltd. Parker Street, Kingsway, London, W.C.2

PITMAN'S BOOKS ON PHOTOGRAPHY



PHOTOGRAPHY: THEORY AND PRACTICE

By L. P. CLERC

Edited by G. E. BROWN,
F.R.C. (Hon.), F.R.P.S.

This is a translation of the French work, *La Technique Photographique*. It is an up-to-date and well arranged book, intended both for study and reference. The practical instructions are of immense value to the beginner in every branch of photographic work, while the

more advanced will find information and interest in the sections on colour photography, stereoscopy, and photo-mechanical processes.
580 pp. Illustrated 35s. net

COLOUR PHOTOGRAPHY

By ROBERT M. FANSTONE, A.R.P.S. Being a new edition of the book by the late CAPT. OWEN WHEELER

An up-to-date Manual, describing Colour Photography in simple language, and providing a practical guide to colour processes for the amateur photographer with some experience of ordinary monochrome work, and for the young professional.

171 pp. Illustrated 12s. 6d. net

PHOTO-ENGRAVING IN RELIEF

By W. J. SMITH, F.R.P.S., E. L. TURNER, F.R.P.S., and C. D. HALLAM

A modern textbook for apprentices, students, and others interested in the technique of photo-engraving. The work of every department of the process engraver's establishment is discussed with clear descriptions and illustrations of the tools, materials, and methods employed in up-to-date practice. Fundamental principles and theory are fully explained and illustrated with plates, diagrams, and graphs, etc.

288 pp. Illustrated 12s. 6d. net

Sir Isaac Pitman & Sons, Ltd. Parker Street, Kingsway, London, W.C.2

PUBLISHED BY PITMAN

Practical Set Structure for the Amateur Cinematographer

By D. CHARLES OTTLEY

This book is invaluable to all keen cinematographers and amateur film societies. It shows how they can build effective sets for use in their own studio. Every piece of apparatus described has been built by the author in the way he explains in the book.

In crown 8vo, cloth gilt, 122 pp., illustrated 5s. net.

Commercial Cinematography

By GEORGE H. SEWELL, F.A.C.I.

Every technical consideration is described, including the range of the cameras and equipment, the operation of apparatus, the use of lighting and lighting apparatus, colour, and the actual shooting of the film. There is also valuable information on the planning of the film, titling, and scenario writing.

In crown 8vo, cloth, 192 pp., illustrated 7s. 6d. net.

Talking Pictures

By BERNARD BROWN, B.Sc. (Eng.)

This book gives a popular account of the principles involved in the production of talking films and of the apparatus used for projecting them in the cinema.

In demy 8vo, cloth gilt, 322 pp., illustrated with photographs and diagrams 12s. 6d. net. Second Edition.

Photographic Chemicals and Chemistry

By J. SOUTHWORTH and T. L. J. BENTLEY, D.I.C., A.R.C.Sc., B.Sc. (Hons. Lond.)

The Authors give a simple description of the principles of chemistry, and explain what takes place in the development, fixing, and after treatment of photographic plates, films, and papers. A list is included giving a brief description of all the chemicals likely to be met with.

In crown 8vo, cloth gilt, 124 pp. 3s. 6d. net.

PUBLISHED BY PITMAN

Telephotography

With Special Reference to the Choice and Use of the Telephoto Lenses in Connection with Photographic and Cinematograph Cameras Employing 8 mm., 9½ mm., 16 mm. and 35 mm. Film.

By CYRIL F. LAN-DAVIS, F.R.P.S. Fourth Edition by H. A. CARTER, F.R.P.S.

A textbook for both professional and amateur photographers who wish to understand the many ways in which the telephoto lens will enable them to extend the range and scope of their photographic work

In crown 8vo, 217 pp., illustrated 3s. 6d. net

Profitable Photography

By WILLIAM STEWART.

An indispensable book for all interested in photography as a paying hobby.

CONTENTS: Preface—Introduction—Glossary of Photo-press Terms—Saleable Photography—Useful Hints—Posing Subjects—Making Snaps Pay—The News Picture—Gaslight Photography—Story and Article Illustrating—The Unlimited Field of Advertising—Markets for Photography—Description of the Illustrations Appearing in this Book—Index.

In crown 8vo, paper boards, 106 pp., illustrated 2s. 6d. net.

The Complete Press Photographer

By BELL R. BELL.

A practical handbook explaining how to take photographs for the Press. Gives advice on how to take and what to take, and includes a list of the chief newspapers and periodicals, giving their usual terms in regard to Press photographs. An invaluable book to both the practising Press photographer and the free lance

In demy 8vo, cloth, 200 pp., with 21 illustrations 6s. net.

Photography as a Business

By ARTHUR G. WILLIS.

Describes the requirements, the possibilities and the limitations of photography as a means of earning a livelihood. It is directed to those already in the business and to those who contemplate entering it. Training, business systems, and selling method for the different classes of work are fully considered

In demy 8vo, cloth, 88 pp. 5s. net.

Manual of Photographic Technique

By L. J. HIBBERT, F.R.P.S.

A simply written and reliable guide to ordinary photographic processes, describing apparatus, materials, and details of procedure for the keen amateur photographer.

In foolscap 8vo, cloth, 140 pp., illustrated Second Edition 2s. 6d. net

Sir Isaac Pitman & Sons, Ltd. Parker Street, Kingsway, London, W.C.2

PITMAN'S BOOKS

ETCHING AND ETCHINGS

A Guide to Technique
and to
Print Collecting

By FRANK I. THAMMILL
*President of the Society
of Graphic Art*

A practical and comprehensive guide to the technical processes employed in making various kinds of etchings

Valuable advice is given to collectors on the selection and preservation of etchings.

272 pp.

12s. 6d. net

238 Illustrations

RETOUCHING AND FINISHING FOR PHOTOGRAPHERS

By J. SPENCER ADAMSON

This book is written for professional photographers and keen amateurs who wish to know the latest methods and processes which are available for the retouching of photographic negatives and prints.

In demy 8vo, 137 pp., with 8 full-page plates and 16 other illustrations. 4s. net.

"Cannot fail to be of great value to the student and to others more advanced."—*Photographic Journal*.

CAMERA LENSES

By A. W. LOCKYTT, *Hons. Silver Medalist, City
and Guilds*

Intended for all serious amateurs, and also for professional photographers. After a simple treatment of the principles involved, practically every type of camera lens now available is described. A study of this book will enable the photographer to select the most suitable lens or lenses for any class of work.

108 pp.

2s. 6d. net

With 100 Illustrations

Sir Isaac Pitman & Sons, Ltd. Parker Street, Kingsway, London, W.C.2